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Unless otherwise indicated, the views expressed in the original articles in this magazine are those of the individual authors and not necessarily precisely those of the Department of the Army or the U. S. Army Command and General Staff College.

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Technology and the Changing Nature of General War

Colonel G. A. Lincoln, *United States Army* and
Lieutenant Colonel Amos A. Jordan, Jr., *United States Army*

This article is based on a paper presented by the authors at the 1956 annual meeting of the American Political Science Association.—Editor.

DURING World War II Winston Churchill is reported to have commented that if the military men had their way they'd fortify the moon. The public press now tells us that our Military Establishment is deeply involved in the preparation of an earth satellite. This is an intermediate step, according to experts in astronautics, toward space vehicles which will voyage to the moon. Undoubtedly, the preliminary studies on lunar strategy already are underway in our nuclear-minded and technologically-goaded war planning organization.

Perhaps of more immediate concern to the mass of professional officers, the public press recently carried the account of a plane overtaking the 20-mm shells fired from its own cannon and thereby shooting itself down. Apparently the race to apply the advances of modern technology to modern weapons has now added another problem to the overburdening load of today's individual fighting man. In previous generations the soldier had to exercise only reasonable and simple precautions against such hazards as being "hoist by his own

petard" or kicked by his own horse. Now his own weapons may be developing into a significant hazard to him and those he protects. It is questionable, for instance, that any subject people would welcome a liberation if it involved a major nuclear effort on their homeland.

This is an era when one of the few certainties is the continual racing change in military technology. And one of the certain uncertainties is the obscurity as to the meaning of this racing change in its application to the affairs of men and of nations. We sometimes hear that the basic military principles, the so-called "principles of war," have not changed—only their method of application. Perhaps this judgment, if true, comes close to Justice Oliver Wendell Holmes' view that "General propositions do not decide concrete cases." One would wonder whether a "principle" having any precise and readily discernible application might not be impaired by a change bringing to armed force the new dimension of mutual annihilation of civilization and conceivably placing the power of decision for such action in the hands of a few individuals—and those individuals not necessarily actuated by the values and other guides which we call "rational."

Are the principles of war, or any set of simple, general statements concerning national security, likely to be much more

Are we of the Western World so committed to deterrent nuclear force and so fearful of the slightest nuclear threat that we lack the means, or wit, or both, to deal with local and limited situations?

than a checklist of problem areas which have to be assessed in making the hard decisions on the concrete cases? Too often the pros and cons on these decisions come out more on a score of 51 to 49 than of four or five to one.

Too Many Imponderables

Yet we badly need reference posts and guidelines for our national security thinking in this nuclear age. This article has the objective of developing some such reference posts in the form of propositions concerning war and technology. These propositions, set forth later in the discussion, are not simple for the reasons, indicated

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above, that unqualified abstractions are not very helpful. Nor are the propositions offered as immutable axioms. When the decisive element is really not pure technology but human beings and their actions and reactions, we are dealing with imponderables and likely irrationalities which make it only wise to define general area targets, rather than the bull's-eye type, in setting down guidelines and reference posts.

The plane incident mentioned previously exemplifies the hazards and obscurities in marrying weapons of different eras—in this case a conventional cannon and a Mach one-plus vehicle—into the same system. The incident is not a bad jumpoff for speculation on the nature of the difficulties of military people if ordered by their political betters to conduct a "limited" non-nuclear war¹ some years from now. The long-range bomb bays designed for nuclear weapons might not be converted quickly to permit a conventional strategic air offensive. In fact, there may be a shortage of any type of bomb bays; the Air Force says that by 1961, 50 percent of procurement will be for missiles. These missiles may initially be lacking in the "pickle barrel accuracy" claimed by artillerymen and the drivers of the B-36's to B-58's and hence, without nuclear warheads, be lacking in military effectiveness. It would be ironic if one of the effects of technology tended to continue the infantry as queen of battles in any nonnuclear war.

Weapons Influence Policy

There are other, and even more perplexing, obscurities born of the technological revolution. No longer is an improved weapon, for example, more megatons per "megabuck," *ipso facto* a successful application of technology to modern requirements for military power. Moreover, modern relationships among military power and its operational applications, and the

¹ James E. King, Jr., "Nuclear Plenty and Limited War," *Foreign Affairs*, Jan 1957, seems to feel this sufficient of a possibility that he argues it at length.

policies and objectives of states are increasingly difficult to trace.

It is easy to agree with the recently expressed view of a member of our Atomic Energy Commission that we are in danger of allowing weapons to dictate policy. In fact, weapons always have, and still do, influence policies. The nature of this influence and the extent to which it limits the freedom of action of policymakers will be increasingly obscure, and hence controversial, as we increase the distance from World War II which was the last testing of military technology in action.

Technology and the changing nature of general war is rightly the central theme of perhaps the greatest of the great debates of our time. The subject is vital. But rather than the subject's vital nature, two other reasons probably underly the intensity of this debate. First, the conclusions accepted by our political leadership determine the type and scope of an enormous impact of taxes and personal service on our citizenry. Second, the most expert, and often the loudest, voices in the discussion are individuals having either personal or institutional interests in the nature of the conclusions.

"Technology" Is Defined

With some trepidation we must attempt to define the two key terms in our title. By "technology" we mean applied science—science applied, for example, to the discovery and acquisition of raw materials, to the design of products, to the actual production process, and to the distribution and control of the end products. It is this broader sense, rather than merely the sense of new instruments of war, that we must consider in defining the relationships between technology and war. Moreover, the current technological surge is accompanied by, and is in large part the cause of, other revolutionary surges: the rampant nationalism which blazes in the rimland of Asia today and which is rising in Africa, the population bomb which can be as dangerous in

the long run as the atom bomb; the increasing application of automation to production, and the rapidly increasing economic interdependence of nations which may revolutionize economic relations in a matter of a decade.

Even in the most narrowly defined military picture, the technological revolution brings unprecedented problems. A technological advantage may by itself be materially significant in world relations and perhaps decisive in war. A major technological breakthrough may shift the military equation, and hence the political and economic equation, decisively—rendering whole weapons systems and even whole security programs obsolescent.

What Is a General War?

"General war" although commonly used in public and official discussion is an elusive concept. The uses of the word "war" itself have changed from the time when Clausewitz defined war as an act of force to compel our adversary to do our will. We have recently experienced a "general cold war," described by Winston Churchill as "all mischief short of war," with only intermittent overt use of military force.

Should any war which involves several of the great powers be called a general war? Undoubtedly, World War II was a general war, but it did not involve all the powers called "great" until some time after its initiation, nor was it at the beginning a total war in the sense that all the belligerents made a maximum effort. Germany, for instance, did not move to total mobilization until after the North African landings. Weapon use was not total, for, although available in World War II, lethal gas was not used.

Our most recent war, the fourth largest in our country's history, has sometimes been called a "police action." Yet the two countries sometimes called "superpowers" were involved, one overtly, one covertly—so also were most of the European great powers, one of Asia's great powers, and

many lesser powers. Furthermore, as its strategy was greatly conditioned by the existence of atomic weapons (possessed in quantity by one side and with a rapidly increasing capability on the other side), it can be well argued that it was the first atomic war. The most advanced and destructive weapons were not used although they were available for Korea and for the associated (separate but related) war fought concurrently in Indochina. Was this situation a "general war" of the modern type, one in which hostilities tend to be geographically localized clashes—piecemeal struggles over the marches between communism and freedom, armed insurrections, and different types of war by proxies of the greater powers? For instance, the institution of foreign "volunteers," certainly one with many historical precedents, may be a usual aspect of future hostilities.

It is probable that the current technological situation has a great deal to do with the newly evident tendency toward an increased free hand on the part of some individual peoples, including those called satellites, in their affairs. Admittedly, it would be difficult, and controversial, to give any specific definition to this aspect of technology's effects. Such a definition would have to deal with such questions as: the contribution of the modern technology to policies of noninvolvement and neutralism; the increased hope that technology makes general war impossible; fatalism; increased confidence of lesser powers in achieving quick multilateral intervention while skirting general war (we should not forget the United Nations and modern electronic communications coupled with sensitivities over nuclear war) as evidenced by the Suez incident; and other very difficult matters which are related in varying degrees to technology and general war.

It is easy to slip into a definition of general war as "the direct engagement, using all available forces, of the two principal allied power blocs in the world." This cur-

rently unlikely situation certainly must be considered and is a major conditioning factor of our military policy.

Limitations Inevitable

Professor Hans Morgenthau suggested recently that the monopoly position of one great power in atomic weapons contributed temporarily to a polarizing effect in international affairs, and that now that several great powers have such weapons, the effect on affinities among states may be more that of repulsion than attraction.

Applying Morgenthau's line of thought to the definition of general war, there may now be an inherent contradiction in the concept of a "general war," including both "no weapons barred," and "allied war." Perhaps the more "general" a war of the future is envisaged to be in terms of weaponry, the less "general" it is likely to be in terms of countries initially involved. This suggestion allows that, after the initial stage, there probably would be a rush to scavenge the global battlefield in much the way that Italy moved against France in 1940. Consider, for instance, the attractive opportunities open to the leadership of overpopulated East Asia in case the US and the USSR clash in an atomic struggle.

As used in this discussion, "general war" will be defined as "a military clash among a number of important states, involving a total or near total military effort on the part of the states concerned." Conceivably, there might be no atomic conflagration even though two or more of the opposing powers possessed atomic weapons and the capability to deliver them, although such a possibility certainly diminishes as the stakes become greater and the issues more vital.

This brings us to the statement of our first proposition which properly concerns itself with the baseline for all thinking about military power. "War is an instrument of policy" said Clausewitz.

Proposition I

Military objectives in war, and military power in times short of war, exist solely to further political ends. Limited policy objectives tend to go hand in hand with limited wars and limitations on use of armed force. Total goals tend to be accompanied by totality in use of armed force.

Throughout modern history, almost without exception the political objectives sought in war have been limited. They have been limited for two main categories of reasons. First, wars have been limited because in the past there has usually not been a military capability to achieve and consolidate a total victory at costs and hazards acceptable to the responsible policymakers. Second, wars have been limited because of the political objectives of both victors and vanquished.

In the past, faced with the technological difficulties of imposing subjugation at acceptable cost and of maintaining its ruling position without adequate control devices, statesmen thought naturally in terms of limited objectives. Rather than obliteration or complete absorption, nations facing defeat generally could expect inclusion in a rearranged balance-of-power system—rearranged against them but not without them. Nor did war objectives, until recently, often include complete social, economic, and even cultural transformations of the vanquished.

Proposition II

Today, and increasingly so in the future due primarily to technological change, the range of military means of states and the consequently conceivable range of political objectives span a very wide spectrum. Hence the uncertainties as to the possible uses of armed force span an equally wide spectrum contributing to the troublesome obscurities as to the type of war for which to prepare and the methods

which might be successful in confining any hostilities within limits ultimately manageable by available political means. The hazards arising from the opportunities and temptations for rash, desperate, or just uninformed leaderships are increasing.

We have had about a round dozen wars since World War II—none of them using the maximum available technological capabilities. Yet our own United States discussions and a major part of our security expenditures have been directed primarily to the “worst possible case” of nuclear general war.

There may be a fallacy developed in implementing this approach similar to that in a presumption by the medical profession that preparations against tuberculosis also will deal adequately with the common cold.

Considering only those objectives which can be won or exploited at acceptable cost, modern military power now overleaps natural barriers which were useful insulation only recently. Small states and even large ones having their nerve centers of industry and political direction concentrated in a few spots conceivably can be paralyzed in a few hours. Distance alone has become progressively less of a barrier to destruction. The only effective counters to destruction are retaliatory capabilities coupled with defensive measures on a level of technology matching the attack (but even a technologically modern defense may be ineffectual unless distance is available for its deployment).

Moreover, populations no longer have the potential they once possessed in passive and irregular resistance to an enemy. In 1776 the American farmer and his rifle could at least be counted in the same terms as the British infantryman and his weapon. Now the technology and art of war make a civilian population almost powerless against modern organized military force. In addition, in Alexander's time, and even

in Napoleon's, the techniques existed to destroy effective opposing military power but not to exploit total victory politically. Currently, the techniques of police power and propaganda and the technology of communications make possible the near total consolidation of victory. The recent events in Eastern Europe admittedly give some hope of qualifications to this judgment.

Clemenceau once voiced the view that war is too important to be entrusted only to generals. Technology may be making war even too dangerous to be used by responsible statesmen. Our own President has indicated his views to the effect that war is an anachronism and that general war is suicidal. Some, both laymen and experts, now turn to total dependence on deterrent atomic power, trusting in Churchill's words that "safety will be the sturdy child of terror." Others take refuge in conclusions that regulation of armaments or world government are just around the corner. Still others argue that complete dependence on atomic deterrence is a blindered approach ignoring the several alternative uses of armed force which may be required under a mutual atomic stalemate and failing to allow for needed flexibility in a future that no one can foresee.

We do not want to imply that the increased uncertainties in use of armed force are entirely due to technology. Some years ago Dr. James Shotwell suggested that the changing nature of society (a change certainly due in part to technology) has made war an anachronistic instrument of policy:

Now war is as uncertain in its direction as in its intensity, or its spread. It is no longer a safe instrument for statesmanship. In short, war which was once a directable instrument of policy has now changed its nature with the nature of modern society and ceases to be controllable and directable—it becomes a contagion among the nations; and one cannot safely use a contagion as an instrument.

Proposition III

If a conflagration of the nature of the general wars of this century gets underway, the alternatives of outcome are an atomic Armageddon or a politically negotiated arrangement with less than total victory.

Now we need a fresh and careful analysis of the alternatives likely to be found acceptable by various national leaderships in the face of threats of extinction such as the unconditional surrender formula which confronted Hitler as he appraised his bleak situation in the winter of 1944-45. Under such circumstances there is a reasonable probability that most leaderships would exert their complete capability in nuclear effort, even to kamikaze tactics before giving way to the opponent. Following the time-worn truth that he who presses an enemy against a closed door must be prepared for a death struggle, one can make a case for the argument that any war of the future between opponents possessing atomic weapons will be either a limited objective war or an atomic Armageddon. Even the lesser powers may soon have a reasonable chance of obtaining atomic weapons under such circumstances as the recent Middle Eastern incident.

Total general war in the pattern of World Wars I and II may not occur again. Those wars, dissimilar from any previous modern wars, were not of a pattern consistent with the use of existing and projected modern weapons. Moreover, their pattern, including in World War II's case unlimited political objectives, if attempted, would in due course lead to the triggering of total nuclear war by the coalition apparently losing. Borrowing words from Clausewitz:

He who uses force ruthlessly must gain an advantage if the adversary does not do the same. Therefore, each pushes the other to extremes to which the only limit is the strength of resistance of the other side.

Proposition IV

We must prepare for general atomic war while recognizing, in case of threat of such a war, all existent political, psychological, and social forces in the world will almost certainly press action toward a limited war.

Experience with Korea and the Western reaction to a Soviet suggestion that the USSR might introduce more modern weapons into the recent Middle Eastern crisis indicate the sensitivity and depth of feeling concerning use of nuclear weapons. There is still, however, a grave question as to whether we may, in our security planning and preparations, stress the concept of general atomic war to the resultant understressing of all other types. While general atomic war is unlikely (and can be kept that way), it is a definite concept for which it is practicable to estimate and prepare. It is superficially suitable for application of the orthodox ritual of war planning and of mobilization preparedness. The mass of the US body politic thinks it comprehends general war (after all, we have had two of them recently) and assumes that the concept is assuredly closely associated with "winning."

Limited war, on the other hand, is an indefinite concept not lending itself to precise prior planning and preparations, not consistent with the American temperament and historical precedents, not suited to our political system, and perhaps not suited to our current executive arrangements. Nevertheless, we need the means for limited war—no matter how distasteful the concept may be to some—and may be crucially handicapped if such means are lacking. Lacking such means, the only alternatives—either all or nothing—may be equally disastrous. Yet it is probably necessary, for the foreseeable future, to have the "all-out" capability in order to make limited capabilities effective as policy instruments.

Proposition V

Technological developments are shifting the impact of general war among those traditional elements of military power lying from fighting front to civilian base. They have also brought about a revolutionary change in the phases of war measured time-wise from tension through hostilities to the stabilized post-bellum situation.

To make war, a modern state has had to have in being from its own or allied resources:

1. Organized military manpower.
2. Weapons.
3. Lines of communications from the basing facilities to areas of hostilities.
4. A home base to furnish personnel, supplies, and the will to war.

The probability seems to be increasing that any general war will be decided primarily with forces "in being," making traditional mobilization measures principally applicable to nontraditional ends—if useful at all. We suggest that such measures may still prove vital, either to provide the necessary element of impetus to a solution short of all-out nuclear war, or to provide the internal discipline and rehabilitation, and also means for external control, in case of nuclear war.

Technology may now be significantly reducing the relative vulnerability of military manpower, and perhaps also of lines of communication—particularly sea lines. Land communication lines might be almost completely paralyzed by refugees and "fall-out." A general war with guided missiles would, for instance, probably be predominantly against, and dependent on, weapons and home bases. There is a very grave question that our logistical concepts and complicated arrangements of layered controls, checks and counterchecks, and involved communications systems are designed to sustain a nuclear attack on the homeland. What would happen if the teletype communications system were nuked?

One of the difficulties of a war of long-distance missile megaton destruction would be the imprecision in relating military action to political aims. A few days' lag in recognizing victory (whatever that word means in such a situation) might well create an insurmountable problem of control and rehabilitation of the defeated.

We suggest a corollary to this fifth proposition, pertaining to details of size, organization, and equipment of the traditional operational military units.

The mobility and firepower of military units increasing geometrically over a short period of time has tended to perpetuate military forces and resources which are redundant. We react to adapt to new capabilities, but we are slow to discard the resources no longer needed.

Any examples to emphasize the above point are bound to bring protests, and the authors here pause to allege their warm personal regard for that noblest of all animals before proceeding to the next sentence. The last US cavalry battle charge occurred about 1900 although the cavalry was still charging in 1941 maneuvers; the seacoast artillery continued until after World War II—but when, if ever, did it need to fire a shot in anger; the race to lay battleship keels before the end of the free license period for doing so, that is, World War II, was, in hindsight's 20-20 vision, rather obviously a race to add to the strength of the mothball fleet.

But what of today? Perhaps we need all the administrative, command, and logistical elements that go with the traditional concepts of "division," "air wing," and "naval carrier." Here we cite a numerical example with some trepidation. Does victory now necessarily rest with the big battalions or are quality and mobility now much more controlling than quantity. Do we now need to consider expanding the number of planes in a wing when every one of the planes already there can lug several megatons of destruction? Are there

target systems that need the attention of more than the current plane strength? Why not consider a 50 percent contraction, rather than expansion of wing strength if these planes are now fitted only for atomic delivery? Do we really need naval carriers supporting a large number of atomic planes as and when small carriers can launch planes carrying atomic weapons? The Army's Pentomic division concept seems, by implication, to recognize this principle of "tendency toward redundancy" by attempting to do something about it.

Proposition VI

The current and future nature of military power, and the effects of its use or threat of use, make essential the close coordination and integration of military, political, and economic planning and direction.

Teamwork among politician, economist, and military man was not a pressing necessity when security expenditures were only a small proportion of national economic effort, and when military force in action was sufficiently slow moving and localized to permit time for statesmen to debate and even to dither a bit, as the military men went about their business. Now, in case of hostilities or even of tension, the military-political situation (for example as to allies, opponents, and insurrections) conceivably can change markedly in a matter of hours. Even in the quiet realm of research and development a technological breakthrough certainly brings perplexity and confusion and might require sudden change in long-term policy and program commitments.

We should think more about the phases of a general war following the initial explosions. There are likely to be at least two: the drag-out and ending of hostilities, and the reconstruction of the world. We have not yet assessed, or even accepted, the lessons implicit in that phase of World War II which extended from V-E and V-J Days to around 1950. We, and particu-

larly Western Europe, have received another taste of the same lessons in the disruptions arising from use of military force at Suez. Any contemplation of the similar phase of a nuclear war is a very sobering experience.

The sixth proposition raises a logical question as to the adequacy of our organization for handling crises in a nuclear world—much too large a subject for this article. It does seem that we have a tendency of closer direction of military force in action—unless the assigned objectives, and weapons permitted, are unlimited. We will pass on with a rhetorical question: Is our Government, or even the Pentagon part thereof, now organized to deal with a general atomic war or even with the many possibilities inherent in the term "limited war"?

If we had the capability to utilize management consultants from Mars in a study of our national security organization and allocation of roles, perhaps the resulting report of Martian Management Consultants, Incorporated, would consign the current organization and assignment of roles of military services (and even perhaps the services) to the museum with the cavalry and the cutlass and propose some drastically different arrangement. Regardless of the color of their uniforms (which approach each other more closely as the Army dons its new garb) many professional officers see an increasing difficulty in allotting national security tasks by service function and a definite need for an approach by the de facto missions which would probably result in one service, if anyone survived, after Nuclear World War I.²

Proposition VII

Military power and hence the nature of an effective security program depends on what statesmen and peoples think it is, until such time as hostilities occur.

²Field Marshal Bernard L. Montgomery suggests there would be one—or at most two, "the Quick and the Dead!"

We Americans are deficient in our intellectual preparation for and against modern war. We should not, for instance, soon forget our record of being surprised by military events—first Pearl Harbor and then, within less than a decade, the strategic and tactical surprises in Korea. Our guidance provided by history as to the nature of general war decreases rapidly in its usefulness as the major wars of this century recede in time while technology and other revolutionary surges add new imponderables to any military equation. Weapons have traditionally outstripped strategy and tactics, and this situation is made doubly true today by military technology combined with world interdependence.

As well as implementing our national policy of deterrence and maintenance of our global position, our security program also has to take account of the traditional requirement for giving confidence to our own people, and of the various strategic impressions created on allies, neutrals, and potential opponents.

Proposition VIII

By tradition, historical experience, and the emphasis in popular information programs, the awareness of the American people concerning technology and war is unbalanced and might lead to dangerously misplaced emphasis in our security programs.

There is, for example, great interest in speed and power of military weapons, as such, but little public interest in defense, as evidenced by the status of our civil defense situation which hardly reflects any great emphasis on the importance of civilian discipline and homefront morale under nuclear attack.

Ready defense is now much more important than a few decades ago when a military strategy could even envisage acceptance of some damage, and even defeat on one border, in order to mass adequate power for a decisive victory in another area, and when the nature of war and

weapons permitted fairly rapid conversion of military power between attack and defense. In 1914, for instance, the conversion of force from attack to defense, or vice versa, was in considerable part a matter of shifting the geographic location of forces and could be accomplished quickly. Now, technology makes any such conversion a matter which has to start from the production line, or even the design board.

The gap in time and effort and other adjustments for the Germans to shift divisions from France to Poland in 1914 must be contrasted to the similar gap in shifting resources today from bomber to Nike, or vice versa. In other words, we must face up to the short run nonconvertibility of forces. Our alternatives in time of crisis are now largely decided by the available mix of offensive-defensive weapons systems which were, in turn, decided several years previously by executive recommendation and congressional action.

Field Marshal Bernard L. Montgomery, in a lecture on "The Panorama of Warfare in a Nuclear Age," 10 October 1956, stated:

We must remember that in future wars the decision will come to the side which can take the appropriate initial action very quickly, and which best uses its weapons from the outset; the decision will come too quickly to learn lessons and make changes.

Proposition IX

The technological revolution is generating increasing security costs for waging either limited or general war and for deterrent programs against any type of war. (This generalization is subject to obvious qualifications in case of any success toward regulation of armaments.)

In event of actual hostilities, "improving" capabilities for destruction, together with highly complex, and hence costly, weapons systems seem to make increasing costs the most likely situation. As for the price of deterrent and confidence-building

military programs short of actual hostilities, there is the great initial cost of weapons systems due to electronic, nuclear, and other costly technological aspects. Moreover, the high rate of obsolescence in a technological race in which no participating nation can permit itself to fall behind and the very high cost of maintenance and operation of modern forces also are factors levering costs upward. Probably the most important cost-raising factor, however, is the need for readiness to "take the appropriate initial action very quickly" against a wide spectrum of possible requirements.

One of the interesting corollaries to this proposition is that the great cost, rather than the leverage of dispassionate security analysis, is the really threatening handwriting on the wall, the "Mene, Mene, Tekel, Pharsin"^a warning the traditional military components that reorganization, and even extinction, faces those who do not continually prove applicability to current security needs.

Proposition X

Technology, interacting with varying philosophies of the nature and duration of the world power struggle, may be occasioning a shift in the patterns and forces of international relations which will make our currently accepted guidelines as obsolescent as the bomber may become in our lifetime.

It is generally agreed that there was a major shift in the method and direction of Communist policy at about the time of the death of Stalin. This shift (albeit possibly only tactical and temporary) was ascribed by at least one informed source, Mr. John Foster Dulles, to the successful methods of US policy. There is little basis for denying that US policy has had a great deal to do with the shift. Those who would quarrel with this view should pause to imagine the situation today if there had

^aThe Biblical translation (see Daniel, 5th Chapter, 25-28 Verses) is suggested as a text for those who would discuss military components gone and going—horse, seacoast artillery, battleships, bomber.

been no Marshall Plan, no NATO, and no use of American military power in Korea, to cite a few of the pertinent US actions.

But perhaps an equally important reason for any change was that the Kremlin has reached certain conclusions about technology and general war leading it to accept a very low probability of using this dangerous and unpredictable program for progressing to its objectives—although not failing to exploit the fears, beliefs, and hopes of free countries with reference to modern technology and general war.

Fear Threatens Default

How firm and how controlling is the nuclear stalemate?

Since Mr. Dulles made the above mentioned statement, we have had both a Middle European and a Middle Eastern crisis—accompanied by evidence of a reversion to militancy on the part of the Soviet Union. Is it not true that one of the most important differences between Budapest in 1956 and Sarajevo in 1914 was the terrifying prospect of atomic hostilities should the West act in Hungary's behalf? *Are we of the Western World so committed to deterrent nuclear force, and so fearful of the slightest nuclear threat that we lack the means, or wit, or both, to deal with local and limited situations?* What backed the effective threat of the USSR to move into the Middle East—a most revolutionary change in world affairs? The World War II Red Army, with its rudimentary technology, enslaved many peoples. Is it possible that Communist political genius can now, discarding the short-term program of smiles and counting upon the disunity and differing attitudes of the free world, find ways to continue to use its great conventional military power with impunity and major reward?

The 10 propositions listed and commented upon here are not presented for uncritical acceptance but rather in the hope that they will contribute to the kind of informed discussion necessary if our Nation is to reach and follow the policies

essential to survival in a revolutionary era of perpetual peril.

It is extraordinary, for instance, that, in view of our massive military publicity on progress toward standardizing nuclear weapons as integral components of equipment of all armed services and our robust comments on nuclear capabilities against any acre of ground (or water) anywhere, there has been no well-publicized discussion of the physiological and psychological possibilities (for example, the refugee problem) of a "general war" fought with the weapons we have already in hand. Nor has there, to the best of our knowledge, been any material scholarly interest in the political, social, and cultural aspects resulting from a general atomic war—those critical and costly aspects after the opening explosions of hostilities, extending through the period of reconstruction.

It has become almost trite to assert that human beings cannot wisely use all the powers of destruction now at their command. Clearly the great challenge of our time calls as much for policy genius as for technological advance. Technological advance has come from a methodical, organized, continuing, and long-term concentration of many minds and, when needed, of inanimate means on research and development. Our country needs the same concentration on the types of problems outlined in this article, a concentration powered by realization of that proposition occasioning our focus on each and all of those 10 set forth above:

There are today two opposing great power groupings. The progress of technology will soon, if it has not already, give each the tangible power to destroy the other. So long as we do not have an effective regulation of armaments, this mutual power of destruction can, with little or no warning, be triggered by miscalculation or irrationalism. On the other hand, we can continue the current situation of mutual deterrence in the nuclear weapons field for the foreseeable future.

READINESS FOR THE LITTLE WAR

A Strategic Security Force

In the first of two articles on this subject (MILITARY REVIEW, April 1957, p 14) a group of United States Army officers outlined a dynamic national strategy integrating political, economic, and military elements. In this article they outline the composition and employment concept of the required Strategic Security Force. The views expressed are those of the authors and do not necessarily represent official viewpoints.—Editor.

THE previous article in this series pointed out that the stability of the peripheral area of the free world, faced with Communist intrusion, is highly dependent upon a United States policy which integrates three elements—political, economic, and military—into a measured and enlightened over-all national strategy.

The political and economic elements of this integrated strategy are essential to its success, but it has been demonstrated that when they are coupled with only a mass retaliation capability, they are inadequate to prevent the expansion of world communism. While communism has intruded easily into areas deficient in military strength, it has been blocked when confronted with effective military strength in being. We speak here not of the "global airpower deterrent," but of the presence of a local security force ready to squelch Communist inspired riots, to make a show of force, or even to thwart civil wars in peripheral areas.

The United States requires a specifically tailored "blocking" force or a quick and ready landing and occupation force to effectively deter the threatened advance of communism in critical areas of the Middle

East and Far East. At this moment such a requirement would have to be met on a crash basis by constituting a patchwork force from standard military components presently scattered worldwide, and assigned other duties. A surprise demand for its use would either go unanswered or would entail the loss of priceless time in assembling and moving even a partially effective force to a threatened peripheral area. On arrival, in all probability on a piecemeal basis, a patchwork force would not have maximum effectiveness while undergoing the throes of reorganization, formulation of plans, and orientation in its new situation.

Dangerous to World Peace

Our reliance on such a crash approach obviously is looked upon with scorn by the Communists since it constitutes only a vague deterrent. Future failures to block creeping aggression, due to the absence of a suitable *ready* military force of the proper capability and composition, not only will emphasize the folly of our failure to shape our strategy properly, but will jeopardize world peace. Hasty moves of ground units would disrupt existing security arrangements in other critical areas of the world by displacing forces committed to other vital tasks.

What is urgently needed now to cope with the demonstrated Communist proclivity for expansion in the peripheral area is a ready force in being—mobile, deployed, trained, and tailored to the capability of the application of a measured degree of force in any threatened area. And this force must not be tied down on other priority tasks.

This article develops a concept of a military element necessary to the integrated strategy of the United States in the strug-

gle to preserve the independence of peripheral nations against Communist intrusion. This military element is designated the Strategic Security Force (SSF).

The purpose of the SSF would be to provide a measured armed strength with which to thwart or immediately block Communist attempts at intrusion in areas of the world in which their efforts are calculated to extend their sphere of influence and domination without starting a global war. This force must be such that it would instill confidence in our Allies and respect in our potential enemies. It should bolster the will to resist on the part of our friends, and promise immediate reaction and resistance to would-be aggressors. It must create an environment favorable to the application of the other elements of our strategy toward peace and freedom, and simultaneously impress upon the Communists the fact that their efforts at expansion, by whatever means, will be fruitless endeavors, resisted with force when necessary.

Capabilities

The SSF must have a wide range of capabilities to deal with foreseeable occasions. The degree of force which might be required could vary widely in a number of possible situations. On the scale of military effort these force requirements range through showing force in a threatened area, providing stability in a politico-military vacuum, applying forceful police measures when necessary, denying at-

tional forces available within a peripheral area. These local forces vary considerably in size, training, equipment, quality, and capabilities, ranging between such extremes as Saudi Arabia's tiny force of 15,000 soldiers and tribal irregulars, and Turkey's well-equipped and well-trained force of 500,000.

The methods applied to achieve success in these varying situations may include furnishing equipment, advice, training, and logistical and tactical support. They may involve the mutual integration of local national military personnel with United States units, the incorporation of local national military units within US formations, or the establishment of combined forces with US forces side-by-side with their local counterparts in threatened areas.

The SSF must be capable of participating in, as well as augmenting indigenous capabilities in the conduct of unconventional warfare. This unconventional warfare capability may be the most remunerative in many areas of the periphery. It must consist of the ability to wage or support psychological, political, and economic warfare; sabotage and antisabotage; evacuation, evasion, and escape; subversion; resistance movements, guerrillas, and refugee liberation groups.

The SSF must contain a civil affairs/military government element to assist local national personnel in restoring and maintaining political and economic stability.

A Strategic Security Force, to be effective, must be ready, trained and prepared to act in support of gaining national objectives short of global war, and deployed in the general areas of probable employment

tempted Communist political infiltration, combating guerrilla action, intervening in insurrection or civil war, and even opposing overt attacks by any outside force against free peripheral nations.

The SSF must be capable of developing maximum military strength in the local na-

This element must be able to work effectively and cooperatively with political leaders and the civil populace toward support of military measures.

Environment

The area in which any of the above capabilities may require implementation

covers the entire peripheral area of the Soviet bloc from the Middle East to the Orient. The climatic and geographical environment in this area spans all conditions characteristic to the temperate and torrid zones, from the rain forest jungles of Malaya to the desert oilfields of the Middle East, to the wintry blasts of the Himalayas. These areas vary in strategic accessibility from the extremes of landlocked Afghanistan, accessible only by air, to Indochina, accessible on three sides from the South China Sea.

The political, economic, and sociological factors within the area vary within patterns and extremes almost as broad as those covering the climatic and geographical conditions. The attitude of the peoples of the peripheral area now ranges from almost fanatic nationalism to apathetic neutralism, and, due to the ever-present agents of the Kremlin, some segments even voice a tentative demand for communism. At future critical times, the attitude of local masses may range from friendly and helpful to hostile and obstructive.

The peripheral area contains some subareas with well-developed transportation systems, skilled labor, ports, airfields, and significant industrial development, while other subareas are at the other end of the scale and are relatively primitive, with few modern manmade developments and improvements. Economically, the area ranges from self-sufficient agricultural, mineral, and raw material exporting economies to primitive agricultural states not

even producing their own sustenance. Some of the areas have the capability for supporting minor military endeavors, while in others any military effort must be supported by outside agencies.

Characteristics

The SSF, in order to accomplish its purpose and to operate in the varied environments of the peripheral area, must have the following characteristics:

1. Include and utilize the capabilities of all services to achieve strategic mobility and to enable it to operate as required in the land, sea, and air mediums adjacent to and within the peripheral area.
2. Be versatile and flexible enough to meet the many possible requirements for its employment.
3. Be a ready force, capable of immediate response. Its principal, probable courses of action must be preplanned and kept abreast of the continually changing situation.
4. Be a cohesive force of assigned tactical and logistical components, trained with rehearsed plans to implement its various courses of action.
5. Be deployed in the general area of anticipated employment and oriented on the troubled spots of the peripheral area.
6. Be independent of other commitment, pending or conditional.

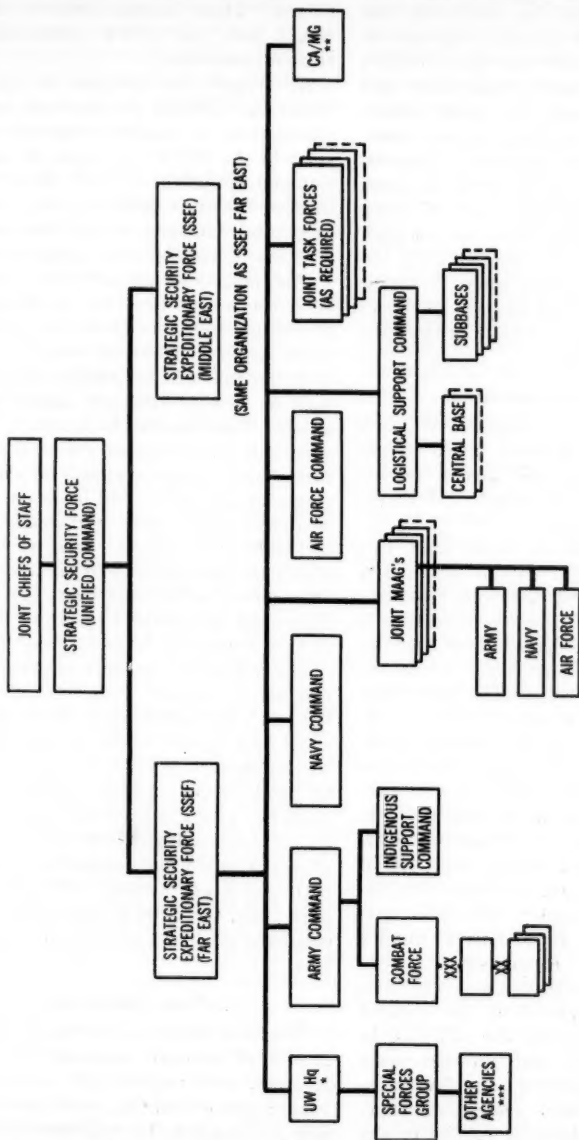
Composition

The SSF envisioned would be a permanently established unified command at the national level. It would be charged with the planning, preparation, and implementation of peripheral action in accord with a national policy aimed at preventing, short of general war, further expansion of the Communist area of influence, and in the event of general war, parrying the first blows while being absorbed in the over-all national defense structure. (See chart.)

The SSF would contain two principal subordinate operational components designated Strategic Security Expeditionary

The following officers formed the study group which wrote this article and the article on the same subject which appeared in the April 1957 issue of the MILITARY REVIEW. Colonels Raymond L. Shoemaker, Jr., Artillery, and Peter L. Urban, Artillery; Lieutenant Colonels John Clapper, Jr., Signal Corps; William D. McDowell, Infantry; Daniel A. Raymond, Corps of Engineers; John K. Singlaub, Infantry; Cecil C. Helena, Infantry; and Major John H. Cushman, Infantry. All are members of the faculty of the U. S. Army Command and General Staff College.

STRATEGIC SECURITY FORCE



* UNCONVENTIONAL WARFARE HEADQUARTERS

** CIVIL AFFAIRS/MILITARY GOVERNMENT

*** POLITICAL, ECONOMIC, PSYCHOLOGICAL WARFARE, ETC.

Forces (SSEF), one oriented on and partially deployed in the Far East area, and one oriented on and partially deployed in the Middle East. Each of these SSEF's would contain significant Army, Navy, and Air Force components, and joint components consisting of logistical support agencies, unconventional warfare elements, civil affairs/military government agencies, joint military assistance and advisory groups, and joint task forces as required. Each SSEF would be charged with the detailed planning, preparation, training for implementation, and support of designated courses of action within its specified area of responsibility.

Army Component

The basic force component of each SSEF is the Army element, based on the demonstrated premise that further expansion of the Communist sphere will be attempted on the ground.

The Army component would have two basic elements—a US combat force, and an indigenous support command. Constitution of the combat force may require a revision of the mobilization base, and an increase in the existing Army Establishment. Initially the US combat component would be based on a corps of three divisions—one airborne, one air transportable, and one amphibious. The amphibious capability might be provided by a Marine division. Corps troops would include the normal supporting units such as artillery, armor, engineer, and signal; and special requirement units such as amphibian vehicle, amphibious support, helicopter, air-head terminal, and air and naval gunfire liaison (ANGLICO) elements.

The principal units, including the divisions, would be deployed in the general areas of responsibility of the SSEF or in the vicinity of the US east and west coasts as appropriate. Logistical and administrative units whose tasks are purely functional and not particularly related to any given area of employment would be ear-

marked for assignment to the SSEF as required. These administrative elements would join the SSEF periodically for training exercises.

All Army units assigned to the SSEF would be modified or standard units, as appropriate. In keeping with their specific roles in the SSEF, the table of organization and equipment for each would be modified to facilitate mobility, and when appropriate, changes would be made to conform to peculiar area requirements.

The indigenous support command would be a component provided to enhance the combat capabilities of local national forces, when required. It would consist of a control headquarters and typical corps troops such as armor, artillery, signal, and engineer. This concept is based on the assumption that many of the local national forces likely to be available in the initial stages of any action will be in the form of relatively small units, principally limited to the infantry combat category. In such forces the nonexistence of significant combat support units must be recognized and they must be provided for if an optimum combat capability is to be developed.

The indigenous support command might function in several ways. It could be utilized as a framework into which relatively small local forces would be integrated, or its components might be placed in support of local forces lacking combat support units but which, otherwise, would be capable of functioning effectively. In the instance wherein the indigenous force had both significant combat and combat support units, the units of the SSEF support command could be utilized for augmentation.

Navy Component

The Navy component of the SSEF would consist of elements necessary to provide strategic and tactical lift (amphibious), supply and evacuation, and naval gunfire and air support. In addition this component would provide forces for demonstra-

tion, and the traditional "show of the flag." The headquarters and control units and the basic operating elements would be permanently assigned to the SSEF. Other elements would be earmarked for assignment as required, and join the SSEF for periodic training exercises.

Air Force Component

The Air Force component of the SSEF would consist of elements necessary to provide strategic airlift, supply and evacuation, and tactical air support. The headquarters and control units and the basic elements such as troop carrier, fighter-bomber, and reconnaissance would be allocated to the SSEF. Other elements would be earmarked for assignment as required, and join the SSEF for periodic training exercises.

The MAAG's

Many of the nations within the peripheral area now have Military Assistance Advisory Groups assisting and advising them in the strengthening of their military forces, including the introduction and integration of United States techniques, equipment, and concepts in these forces. These MAAG's are, in general, joint efforts involving all three of the US services, with the ground warfare capability receiving the greatest emphasis. For peripheral areas in which MAAG's do not exist at present, the SSEF, under the concept advanced here, would establish planning groups to develop requirements and plans for future possible MAAG assistance.

Under the Strategic Security Force concept, MAAG's would be incorporated within the Middle East or Far East SSEF's to provide a greater degree of coordination and flexibility in the integration of indigenous forces into a unified global effort. MAAG efforts would be expanded to include combined planning and training of indigenous forces with the combat and combat support forces for the SSEF. Pre-planned courses of action for use in fore-

seeable contingencies would be developed and exercised. Where security pacts exist in the peripheral areas, such as the SEATO or Baghdad arrangements, the courses of action would be designed within the sphere of activity of those organizations.

Logistical Support Command

A necessary integral component of the SSEF is a logistical support command designed to provide logistical support to the SSEF and the local forces within its sphere of activity. This command, predominately Army, with necessary Navy and Air Force elements included as appropriate, would include the supply and service agencies normally utilized in a small overseas theater of operations.

Within each of the SSEF areas (Middle East and Far East) a principal central base installation would be required in the absence of a comparable facility available in an already established overseas command. Subordinate bases would be located in peripheral nations in which MAAG's are established. Each base located within a peripheral nation would consist of those logistical components necessary to support MAAG operations within that country, and a sufficient reserve to initiate and sustain initial military operations within that country. These bases normally would be established and operated by the indigenous forces themselves, with US augmentation required only in the event of the employment of the SSEF within a specific area. Included within each of these MAAG logistical support systems would be a capability for expansion, in the event of hostilities, to the degree necessary to support both indigenous and SSEF forces. The preparations for this expanded capability would include such provisions as the preparation of airbases, the construction of POL tank farms and pipelines, the improvement of transportation systems, and the provision of storage facilities.

The central base installation of each SSEF would contain logistical agencies,

supplies, and material necessary to support the continuing operational requirements of the SSEF, and initial reserves and agencies to supplement those located in peripheral nations in the event of hostilities. The Navy and Air Force components of the SSEF would include the capabilities for establishing surface and/or air lines of communications between the SSEF central base, or other designated base, and the several subsidiary bases located in the peripheral countries. Lines of communications between the central base and the continental United States would be the responsibility of the Department of Defense or overseas theater commander as appropriate.

The headquarters and minimum necessary operating agencies of each of the central bases would be permanent establishments. Advisory personnel would be located within the logistical support systems of each peripheral nation as required, as part of the MAAG's. The functional components necessary to expand the logistical support systems of the peripheral countries would be provided on an earmarked basis within the Zone of Interior or at the SSEF central bases.

CA/MG Capability

Any attempted expansion of the Communist area at the expense of peripheral nations generally will result in hardship to the civil populace such as displacement from their homes, disruption of their ways of living, loss of food supplies, loss of the means of livelihood, increase in the incidence of disease, and suspension of the normal processes of law and order. The SSEF must, therefore, have a civil assistance and military government capability in keeping with the traditional US concept of humane treatment of our fellow men, and in the interest of facilitating execution of our over-all strategy. Civil assistance requirements may range from providing aid through existing civilian agencies to assisting victimized nations to

reestablish their national economy.

Included within the SSEF for this purpose are CA/MG units and planning groups. Preplanned courses of action would be drawn up for each of the contingent areas, and the SSEF logistical system would contain supplies necessary to implement the various courses of action.

Unconventional Warfare

Included within the SSEF organization is a joint headquarters of Army, Navy, and Air Force representatives responsible for the coordinations of all unconventional warfare activities in the potential area of operations. These unconventional warfare operations would include overt and covert activities in the interrelated fields of guerrilla warfare, evasion and escape, and underground resistance. Operations behind the enemy's lines would have to be coordinated closely with the over-all strategy in order to obtain the maximum effectiveness in reducing the military, economic, psychological, and political potential of the enemy. In addition to the staff of the UW Headquarters, there must be a force in being (a Special Forces Group) capable of providing direct aid, assistance, and even leadership to groups of potential guerrilla or resistance fighters. Other agencies required for political, economic, psychological warfare, and similar purposes would be assigned to this headquarters and integrated into the SSEF.

Joint Task Forces

The SSEF must be prepared and free at any moment to move into any threatened area with the requisite amount of assistance. The required amount of assistance might range from relatively minor elements to the entire resources of the SSEF. In minor actions, the SSEF commander would constitute a joint task force(s) and assign thereto the necessary SSEF components, delegating direct control in the threatened area to the joint task force

commander. The SSEF would then assume the role of supporting and coordinating the actions of the joint task force(s). In the event the necessary action involves a major commitment of the resources of the SSEF, the SSEF commander would assume command of operations in the threatened area, relegating the SSEF base and headquarters to a supporting role in a rear echelon capacity.

Summary

A realistic and enlightened US strategy aimed at preventing further expansion of the Communist bloc must include the capability of meeting the limited threat with measured force as an essential instrument of national policy.

Such a force, to be effective, must be a

ready force, free from other priority commitments, trained and prepared to act swiftly in support of gaining national objectives short of global war, and deployed in the general areas of probable employment. It must be a source of strength to our allies and a deterrent to potential aggressors. Its nucleus should be a versatile combat-ready Army component, provided strategic mobility and tactical and logistical support by the Navy and Air Force.

The Strategic Security Force should be coupled with political and economic elements of our strategy in being, and add flexible strength to US power.

A Strategic Security Force would fill the vacuum between impotency and massive retaliation, by adding the *measured* force.

We should by all means include in our program effective political and military plans to deter further Communist aggression against "soft spots" about the world. It is not too difficult to identify those areas which may be possible targets for aggression. Since becoming Chief of Staff, I have frequently commented upon the increasing danger of so-called small wars, which may erode the borders of the free world.

Particularly, as our air-atomic deterrent capability increases, it becomes increasingly unlikely that any aggressor will deliberately embark upon a course of action calculated to bring on general atomic war. It is more and more apparent that such a war would be a mutually suicidal action from which no true victor could emerge.

On the other hand, the attractiveness of undefended assets and resources offers an inducement to small-scale aggression which potentially may be as dangerous as the big war itself. The small war which is not quickly suppressed may expand slowly or rapidly into the general war which all sane people are so anxious to avoid.

* * * * *

There can be no gaps in effective deterrent power. It must exist in the air, on the sea, and on the land, and it must be constant over an indefinite period of time.

General Maxwell D. Taylor

Beach Operations Under Missiles and Atomics

Major Frank B. Case, *Transportation Corps*
Oversea Operations Division, Office of the Chief of Transportation

In the following article the author discusses the problem of moving logistic support onto and across a shore in operations conducted under missile fire and under atomic conditions or the threat of atomics. In next month's MILITARY REVIEW Major Thomas J. McDonald, Ordnance, will discuss dramatic possibilities for the long-range solution of the problem of moving men and matériel, with emphasis on logistic air delivery and cross-country support mobility.—Editor.

BEACH landings in World War II and Korea, with a few exceptions, were tactical assault operations conducted in accordance with amphibious doctrine. Since Korea, the Army, Navy, and Marine Corps have been engaged actively in adaptation of amphibious doctrine—doctrine which applies specifically to combat landings against defended shorelines—to the requirements of missile and atomic warfare.

Beach landings for logistic purposes, however, have been the subject of much narrower interest. Notwithstanding the Army's NODEX (New Over-the-Beach Discharge Exercises) in France, development interest in over-the-shore logistic operations has been limited and spotty. To a considerable extent, beach operations for logistic purposes have remained a poor cousin of combat amphibious operations.

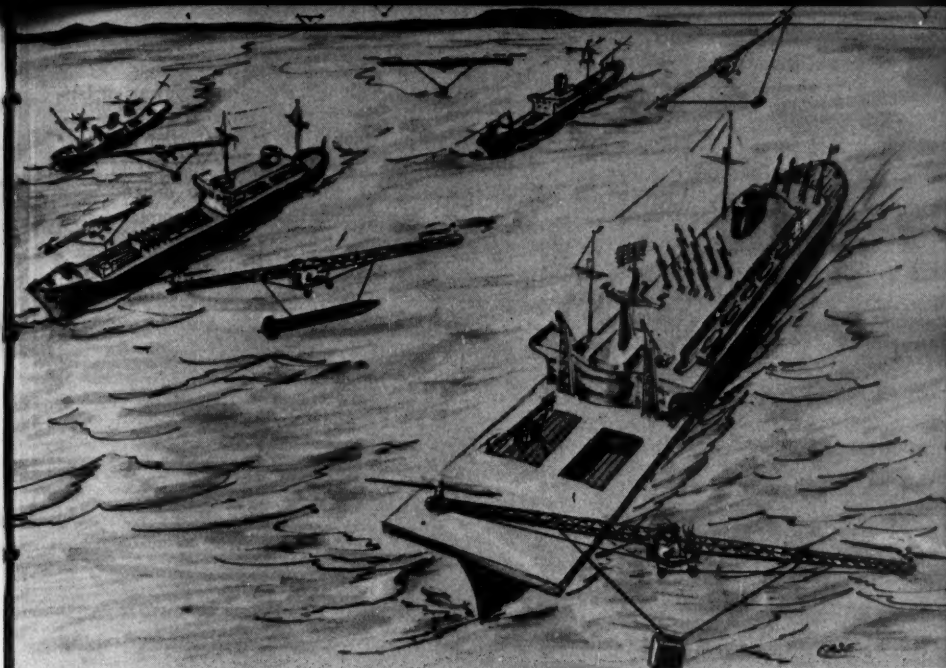
Combat amphibious doctrine and techniques are not applicable in many respects to over-the-shore logistic operations. The doctrine appropriate for a onetime assault on a locally defended position is not the doctrine necessary for sustained resupply operations conducted under enemy area-defense missile fire.

Navy primacy of command of forces afloat, through the "jointure of command" provided in the *Navy Amphibious Manual*, is out of place where the primary task of the naval agent is to furnish ocean transportation of supplies on a point-to-point basis and where the accomplishment of the cargo delivery ashore, whatever the techniques employed, is purely an Army mission. The equipment required by the Marine Corps for the movement of combat troops and their matériel onto a defended shoreline is not the equipment required to deliver heavy tonnages of Army support supplies on a sustained basis over that same shoreline after completion of the assault phase. (The latest Landing Vehicle, Tracked (LVT), for example, has lost the practical cargo carrying characteristics of its predecessors.)

Need Separate Development

A line of development, separate from and independent of amphibious operations, is necessary to assure early achievement by the Army of an effective and dependable over-the-shore cargo delivery capability.

Developments to ensure successful over-the-beach logistic operations have not kept pace with the refinement of tactical amphibious doctrine. It is essential that effort be focused on this field without delay



The Nest Ship, carrying its brood of utilitarian flying cranes designed for maximum lift capacity, will rendezvous with the cargo convoy offshore. Like a swarm of locusts the *Skyhooks* will eat the supplies out of the cargo vessels and deliver the prepackaged units to tactical units ashore, without regard for beach obstacles. As soon as the rapid-fire unloading is complete the Nest Ship departs to rendezvous elsewhere with another convoy.

ity which meets the requirements of warfare in the missile age. This development is of great importance to all Army planners—to the logisticians, because the techniques of delivery of supplies over the shoreline have a major influence on the organization and operation of the logistic support zone, and to the tacticians who cannot contemplate combat force dispositions without assurance of effective lines of communication.

According to recent newspaper reports, Russia has started mass production of supersonic guided missiles capable of hitting targets 650 miles away with atomic warheads. This development has revolutionary implications for ground force logistics. Although a great deal of lip service has been paid to the principle of dispersion in

concepts of future war, existing Army logistic doctrine and techniques are designed primarily for sustained cargo handling operations through fixed ports or over developed and stabilized beaches. Cargo delivery capabilities in being are based on the assumption that a major portion of fixed water port facilities will be available and usable in future war.

The availability of medium-range guided missiles with atomic warheads, however, will permit a defending force to deny the use of fixed ports and good beaches to logistic elements supporting ground combat forces. This denial capability will be relatively unimpeded, regardless of the distance to which invading armies penetrate enemy-held territory. At the present stage of missile development it would be

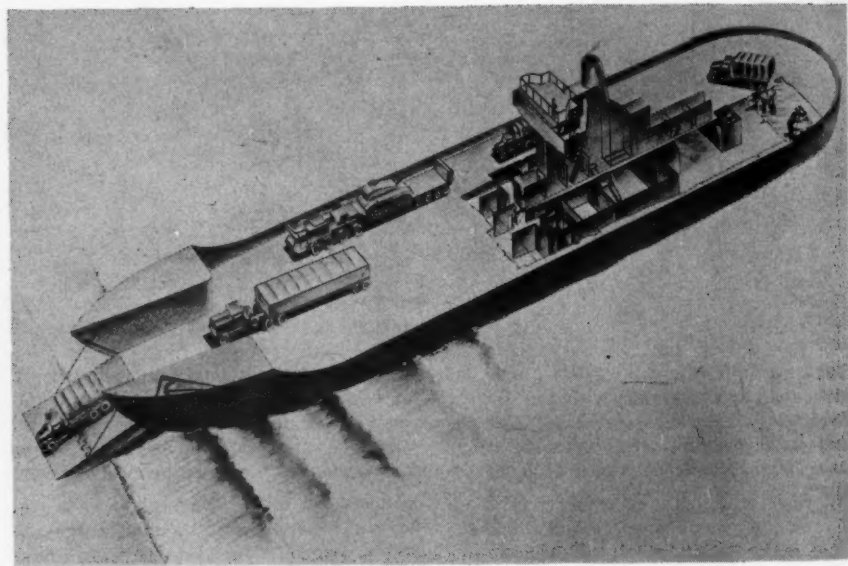
necessary to capture Munich before enemy capability to interdict Bordeaux could be inhibited.

Air Too Costly at Present

The logistic air delivery concept has gained considerable support as the solution of sustaining ground attacks where a defending force is capable of denying the use of surface logistic bases at rela-

Solid chemical fuels, atomic power, or levitation may revolutionize the art in the future. Until such a revolution is nearer at hand, massive logistic support of over-sea forces will continue to depend upon sea transportation and complementary shoreside services.

There is room for doubt that the Navy, with its present capabilities, could in fact



An artist's conception of an Army roll-on roll-off beach lighter. Such lighters, and larger ships with the same characteristics, should be developed or produced by modification of existing hulls if logistic support is to be adequate in any war between now and the time when we are capable of establishing and maintaining an air line of communications.

tively long range. Without doubt, logistic air delivery has a large part to play in future war, particularly in local distribution of supplies and personnel, in evacuation of casualties, and similar roles. But at the present state of the art of air movement the provision of airlift resources in quantities sufficient to support an extended war without reliance upon sea and land transportation would, by itself, exceed the economic capabilities of any world power.

maintain sea lines of communication in the face of Soviet submarine attack. More to the immediate point, the Navy does not possess sufficient specialized shipping to transport to oversea destinations such heavy, outsize equipment as the large landing craft which the Army must have in quantity in order to discharge large volumes of general cargo from ships outside of established ports.

Aggressive development and volume con-

struction of roll-on roll-off ships and such other specialized types as self-propelled floating docks are necessary to bring Navy support capabilities up to the requirements of general war. However, for the purpose of this discussion, the assumption must be made that in future war, notwithstanding present gaps between Navy capabilities and requirements for operation of sea lines of communication, the Navy will be able somehow to continue to deliver Army equipment and supplies where and when the Army needs them. For if this assumption cannot be made, the conduct of intercontinental wars by land forces will be impossible until that distant time when long-range cargo airlift is able to replace ocean transportation.

Won't Have Best Beaches

Having made the assumption that the Navy will continue to be able to move cargo ships to oversea destinations under combat conditions in the immediate and middle future, the Army for its part must establish a capability to provide the services necessary to move supplies from ship-side to suitable points of rest on the shore. Guided missiles with atomic warheads will be a primary weapon in the enemy's defense of his coastline against invasion by land armies. The defender would be guilty of improbable negligence if, having a missile capability, he failed to pretarget and place fire, as a matter of routine, upon fixed ports and beach areas favorable to land-

Major Frank B. Case entered the service in 1941, was commissioned in the Chemical Warfare Service in 1943, and detailed to the Transportation Corps the following year. He went to Europe with a harborcraft company in 1944 and remained there on various duties until 1947. He spent five years with the New York Oversea Supply Agency, and in 1953-54 served with the Transportation Section of the Korea Communications Zone. Major Case currently is assigned to the Office of the Chief of Transportation and since 1954 has been concerned with staff planning for Army transportation support of DEW Line construction.

ings of ground forces and their logistic supporting elements. However, the need for conserving his resources will oblige the enemy to limit his predetermined dispositions of fire to those points the use of which most obviously must be denied the attacker.

When landings are made at other, less favorable locations, the defender will be compelled to locate and identify landing forces before he fires on them. The fact that the defender's atomic missile reaction to landing operations, outside of developed or geographically favorable points, will be delayed until he has discovered and identified the operations as targets, will give a landing force the opportunity to carry out a limited mission and escape successfully.

This fact is the premise which permits the development of a concept for over-the-shore logistic operations under defensive atomic fire delivered by guided missiles.

The Skyhook Concept

Under Marine Corps guidance, amphibious doctrine is moving in the direction of helicopter lift of initial assault waves above hostile shore defenses, and looks toward eventual movement by helicopter of all elements of amphibious assault forces. Army long-range planning parallels Marine Corps thinking in this respect.

At this time, a high-capacity helicopter designed specifically as a short-range cargo carrier—the flying crane, or *Skyhook*—is under development. Advent of the *Skyhook* in sufficient quantities may make the use of landing craft and amphibious vehicles in over-the-shore logistic operations a matter of history.

The prospect of solving ship-to-shore supply delivery problems through the use of helicopters has a strong appeal for the logistic planner, hard pressed by modern needs for speed and mobility.

The broad concept of *Skyhook* over-the-shore logistics is simple. Steaming offshore, the cargo ship opens her hatches. A flying crane hovers over the hatch, hooks

onto the draft of prepackaged cargo in the square of the hatch, lifts and swings away to shore. Another *Skyhook* stands by ready to carry off the next package. Within a matter of hours the helicopters eat the cargo out of the ship, stripping it to an empty hulk.

Of course, in this as in other things the simplicity of the concept is deceptive. "All is simple in war; only the execution is difficult." In the first place, flying cranes will not be out of development for some years to come, and less glamorous systems will be required meanwhile. However, examination of the ways in which *Skyhook* operations will meet the problems presented by the enemy's possession of an atomic missile defensive capability is instructive, because the principles of operation remain the same, whatever the hardware may be.

Must Have Floating Bases

The provision of bases for the *Skyhook* helicopters is one of the primary problems. Land bases necessarily imply concentrations of men and matériel at locations accessible to enemy weapons, and it is by now axiomatic that such concentrations must be avoided in the atomic missile age.

The need for bases could be eliminated by having each ship carry its own *Skyhooks*, but this would result in extremely poor utilization of critical equipment. The most practicable and desirable course is the development of Nest Ships, each carrying a large number of *Skyhooks*, together with the fuel storage and maintenance support necessary to keep the helicopters operational over long periods. Each Nest Ship would be the operations control center for the cargo handling operations conducted by its *Skyhooks*. When not in rendezvous with a cargo convoy, Nest Ships would cruise outside enemy observation, maneuvering to avoid detection.

When *Skyhooks* and their Nest Ships become available to discharge cargo fleets, the defensive capabilities of the fleets

themselves will be materially improved. Instead of rendezvousing in restricted roadsteads, offering irresistible concentrations of forces as atomic targets, support fleets will operate well offshore. They will be able to remain on the move, well-dispersed even during actual cargo handling operations, defending themselves by advanced antisubmarine systems and missile-killer missiles, but principally relying for their defense on the distinguishing characteristic of sea warfare—relatively unlimited mobility in relatively unlimited space.

Hit-and-Run Operations

The long lines of *Skyhooks* traveling between ship and shore will tend to indicate the location of the cargo fleet to enemy detection systems, as swarming bees disclose the hive. Complex flight patterns, together with diversionary movements, will be employed to confuse the enemy as to the location and direction of movement of the support fleet.

Nevertheless, since continuous operations from any type of logistic concentration will betray that concentration to the enemy, *Skyhook* operations will be discontinuous. Quite probably the cargo fleet will be unable to maintain its concentration for more than one day. Discharge operations will begin when the cargo ships and *Skyhook* Nest Ships make their rendezvous after darkness of a predetermined day. Three or four hours after darkness, air delivery from ship to shore will begin, continuing through the daylight hours into the following night. Some time during the second night the unloading of the convoy will be completed, the *Skyhooks* will return to their Nest Ships, and the seaborne force will disperse. Two, three, five days later, another seaborne logistic force will rendezvous at another location for another *Skyhook* landing.

The advantages of *Skyhook* deliveries from ship to shore will be dissipated unless landside logistic concentrations are avoided in the same way that concentrations of shipping and cargo handling forces at the

coastline are minimized. Long lines of trucks running back to supply points, from supply points to Army dumps, from dumps to depots, are the antithesis of required mobility and dispersion of land forces. This kind of line of communications is inordinately costly in men and matériel; it ties the combat force to an inelastic lifeline; and enemy guided missiles will render impracticable the concentrations of supplies and facilities involved in such a system.

Provide for Independence

Direct delivery from cargo ship to user—one lift, through movement—is the ideal over-the-shore logistic operation. To accomplish this ideal, the organization of combat logistics must be changed. Tactical elements must carry their logistic tails with them and be able to operate in logistic isolation for periods of several days.

A possible module for the self-sufficient tactical element is the squad carrier which will transport men, a supply of fuel for the vehicle, ammunition for individual and squad weapons, food, water, and emergency medical supplies. Resupply deliveries will be packaged in a set for the mobile squad, thus eliminating the need for dump breakdown and distribution of bulk commodities—and eliminating the dump. A *Skyhook* will deliver resupply packages for a platoon or a company to the company's battlefield position. Diversion of tactical element effort to logistic problems will be reduced to nearly nothing, and the tactical element will be given an altogether new order of mobility.

When attacking forces have penetrated and consolidated a sufficient depth of enemy territory, the limited range and turnaround time efficiency factors of the *Skyhook* will require establishment of intermediate bases on land. This will involve only an extra pickup of the supply packages, without change of the ship-to-user delivery concept.

The *Skyhook* delivery system, when it

becomes available, will go far toward satisfying the speed and mobility requirements for logistic operations in support of ground combat. But the heavy-lift flying cranes must be created and produced. Nest Ships must be developed.

Complicated Communications

Novel communications systems will be necessary to control large numbers of air units moving between mobile land and sea terminals. Advanced air guidance systems will be needed to enable aircraft to operate at low altitudes, under zero visibility conditions, between the pinpoints of chopper pads on cargo ships and individual combat organizations on a fluid battlefield.

Combat logistic doctrine must be revised to take advantage of the potentialities of the *Skyhook* delivery system, and ground force equipment to implement the doctrine must be produced. All these elements are mutually supporting; one without the other, or some without the rest, will be relatively ineffective and more or less uneconomical. The investment in matériel, production effort, and training effort to support these revolutionary programs will be great and cannot be undertaken except on the basis of long and thorough study. For these reasons the *Skyhook* delivery system will not be available for over-the-shore logistic operations for several years.

Need Transition Concept

The problem today in over-the-shore logistics is to achieve the speed and mobility which *Skyhook* operations eventually will afford—but without the *Skyhook* delivery system. For the next few years cargo delivered to overseas destinations by ocean carriers in wartime will be discharged across beaches and moved beyond coastal barriers by organizations and equipment now available. But this inheritance from the past must be adapted with vigorous imagination to the needs of the immediate future. Existing logistic doctrine must be reviewed rigorously, the obsolescent brought up to date, the obsolete eliminated,

and sacred cows in general brought to the block.

As a first step the relationship between amphibious operations as combat operations and over-the-shore logistics as non-combat operations must be redefined. Defensive fire, per se, will not make a "combat" operation in the future. No operation within reach of enemy missiles will be free from the threat of enemy fire. The missions of all forces must be defined with that fact in mind.

The role of amphibious forces lies in the assault against specifically defended shorelines. Amphibious forces will be called upon to seize initial footholds on enemy-controlled territory against ground defenses. When attacking forces have gained control of considerable land areas after conclusion of the beach assault phase, or when the perimeter of the enemy territory is not actively defended by ground forces, such fire as may be brought upon logistic landing forces will be of an area defense nature. In this case enemy missiles, as well as weather and terrain, will have to be considered as normal obstacles. Army logistic forces cannot allow their mission to be preempted by amphibious forces, and the combat arms cannot permit diversion of their limited amphibious capability to continuing logistic support roles merely because there is a likelihood that over-the-shore logistic operations will draw enemy area defense missile fire.

Forget Good Ports, Beaches

A new element of flexibility must be introduced into the employment of over-the-shore logistic forces. The enemy capability to deny landing forces the use of established ports and favorable beaches requires the discounting of all prospects of beneficial use of such facilities. The enemy capability to locate and disrupt continued operations at any location makes illusory those concepts which contemplate stabilized port and beach operations.

Over-the-shore logistics must be hit and run. Continuity of supply support of

ground armies will be achieved by localized, rapidly displacing beach landings of short duration and high frequency. A landing point may be reused, but only irregularly. There must never be concentration at one point over a space of time enough effort to give the enemy justification for establishing special observation of that point, and targeting it for specific missile attack.

Simultaneous discharge operations at many scattered points will be necessary to secure adequate supply deliveries on this type of piecemeal basis, which is the complete opposite of the sustained flow over piers by which ground forces have been supported in the past. In this respect the Army's cargo deliveries to Distant Early Warning System bases in 1955 and 1956 were comparable to the procedures required for future war. Supplies were delivered at many locations spread over several thousand miles of shoreline in a limited period of time. Beaches were selected to serve installations established with other considerations than cargo delivery in mind, and cargo handling conditions were far from ideal.

With this one element—simultaneous operations at many points—however, the similarity between Distant Early Warning System support and future war logistics ends. Army DEW Line support operations were performed in accordance with thorough, detailed operations plans developed over a long planning period. Each operating element was furnished with detailed instructions covering every foreseeable contingency. Consideration at the task group level was required only when rare and relatively minor unforeseen emergencies arose. When the single mission of each element was completed, the entire force withdrew and disbanded.

In Fast—Out Quickly

Employment of logistic forces on enemy shores in wartime will be another matter. Logistic commanders will not be able to enjoy the luxuries of postoperation with-

drawal to interior bases, leisurely preparation of detailed operations orders, blueprint loading of cargo ships for convenience of discharge, and one-shot performance from major logistic forces.

When a landing team—a company-size organization, including stevedoring, lighterage, shore party, maintenance, and local defense elements—completes a ship discharge task at a landing point, that team must displace promptly to a new location and another ship. To avoid delay in relocation, a basic change in the method of assigning missions to cargo handling forces will be required. Terminal team missions must be defined on a specific task basis rather than on a continuing general functional basis. Since a terminal team will not be operating at Charlie Pier or Red Beach for the next six months, but may be 50 miles up the coast in 24 hours, the mission of that team cannot be expressed in terms which merely require it to place two hatch gangs and a shore gang at ship-side every 10 hours.

Specific missions must be assigned to individual landing teams in accordance with the latest phase of the changing situation:

Team Bravo will discharge the SS Hopeful Victory at Point X-Ray beginning at 172300 local, completing discharge by 190500 local, using the means appropriate to the situation.

Need Floating Bases

For successful conduct of such a hit-and-run type of operation, landing teams will be required to operate from mobile floating bases. The entire landing team with its lighterage and cargo handling equipment will be mounted on and operate off a ship of suitable characteristics. Among the ship designs now available, the Navy Landing Ship, Dock (LSD), is a suitable type for a mobile landing team base.

Analysis of Army logistic force requirements may reveal that equipment as costly and complex as the LSD is not necessary.

At any rate, only a few LSD's are available, and no consideration has been given, in constituting fleet reserves, to Army requirements for suitable base ships. *Army sponsorship of designs, and Army procurement or support of Navy procurement of an adequate reserve of base ships are essential. Without these actions the Army will continue to lack a primary element of the mobility which future over-the-shore logistic operations will demand.*

Command control of several ship-based landing teams maneuvering rapidly over a wide area will require equal flexibility and adaptability in the operations control group—the headquarters force which will direct landing team operations. The successor unit to the port command headquarters will be different from any logistical organization now existing. In addition to directing the movement of landing teams, the operations control group also will coordinate the movement of cargo ships to rendezvous with the forces which will discharge them.

Army Must Control Unloading

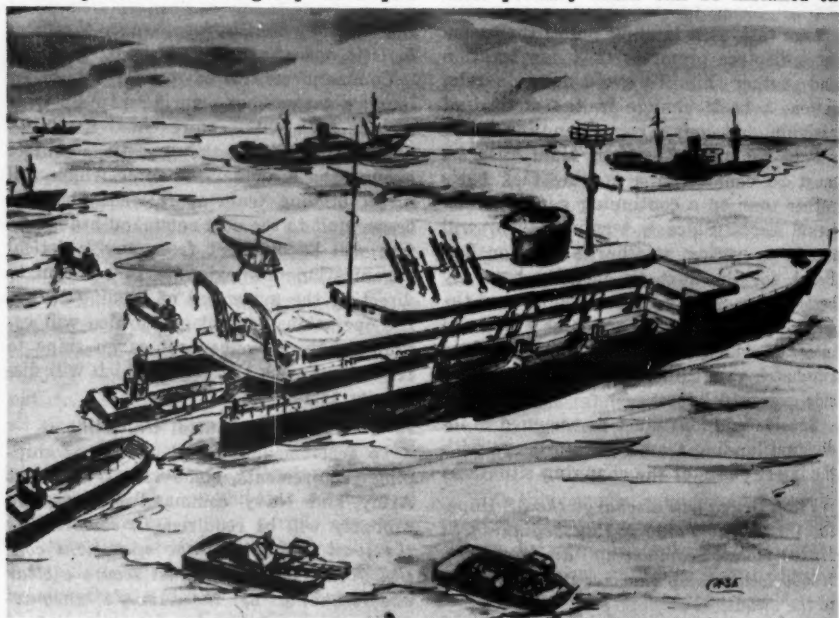
To accommodate naval control of shipping requirements, some variety of joint Army and Navy command organization probably will be required. *In constituting the joint elements of the operations control group, the Army must secure a clear understanding of the Army's unequivocal responsibility for determination of landing sites and scheduling of ship movements within the over-the-shore delivery zone. The Army commander who is prepared to risk the loss of Army operating forces to achieve his objective must have equal authority to require the risking of cargo ships to achieve that objective.*

Techniques for coordinating discharge with beach clearance agencies of the ground combat forces must be developed. At present there are no techniques or procedures available to satisfy the need for coordination, between forces ashore and forces afloat, of support operations conducted without the link provided by a

stable, land-based logistical rear complex. To meet this requirement and the need for control of maneuver of landing teams and cargo convoys, a new type of logistic communications system and a new comprehension of supply and movement systems are necessary.

The operations control groups developed

trol group must be able to maneuver flexibly to accompany its landing forces from one operating zone to another. Of particular importance to the control group operation is the fact that the permanent type communications facilities which will be required for the accomplishment of the three primary tasks can be installed on



Unloading and beach operations will be the responsibility of landing or terminal teams organized for those specific purposes. Aboard its own floating base (a modified LSD or a ship designed specifically for the purpose) the team will rendezvous with a cargo convoy, launch its specialized lighterage and cargo handling equipment, unload one or more ships in the shortest possible period, and then leave to perform the same service for another convoy off another beach some distance away.

to perform these interrelated, but never before integrated, functions—direction of mobile landing team operations, control of cargo shipping, and coordination with flexibly maneuvering land forces—should be mounted on command ships designed for the purpose. Defensive mobility is as essential to the protection of the control group as of the landing teams. The con-

shipboard but cannot be provided ashore under the conditions given.

Functional Control Group

Operations control groups will be organized in accord with new concepts of port headquarters organization. Only the muscle and sinew of the operating staff organization can be retained; the fat must

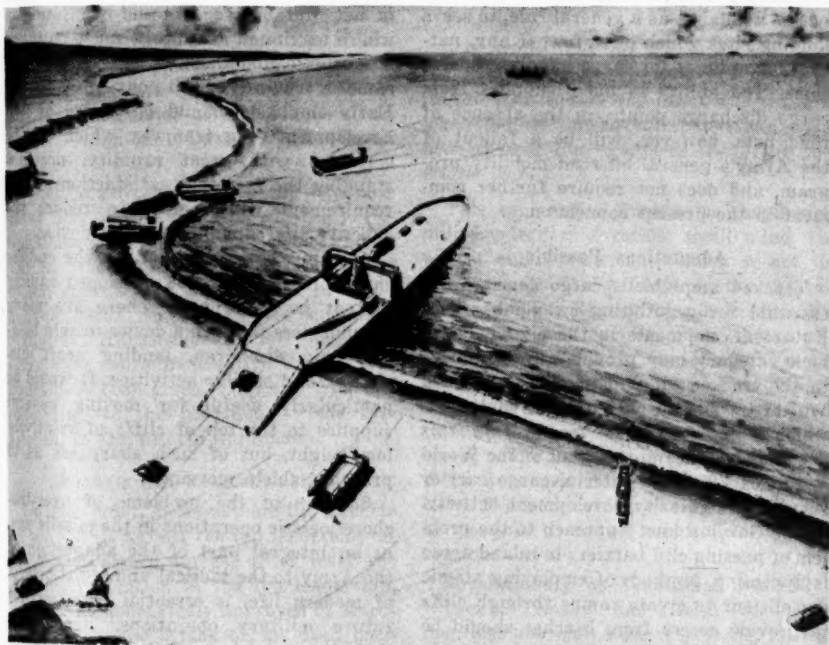
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go. The people who occupy precious ship-board space must be those who contribute functionally to accomplishing the mission.

That mission itself must be redefined to limit control group responsibilities to the conduct of operations. The area command and housekeeping functions which in the past have accrued to port commanders

hand or in advanced stages of development—the *Superduck*, the *Drake*, *BARC*, the beach lighter, the various landing craft—is effective for over-the-beach cargo handling where reasonably favorable conditions exist. When the enemy missile capability is employed to deny the use of favorable locations, the Army must be equally pre-



Here, an artist visualizes a recommended over-the-beach supply operation in the intermediate future. Landing craft, lighters, *BARC's Drakes*, and *Superducks* discharge cargo from ships at anchor offshore. The beach lighter shown is a roll-on roll-off type craft which will increase ease and speed of unloading at the water's edge.

will have to be assumed by other headquarters—or eliminated. The operations control group must be trimmed to fighting weight, and trained to a keen edge of alertness to respond to situations which will change constantly and in more dimensions than its predecessors ever experienced.

Rapid evolution of equipment is necessary for over-the-shore logistic operations under this new pattern. Equipment now on

pared to land cargo at unfavorable points without loss of speed and efficiency.

The primary problem to be overcome is the passage of shoreline barriers, after amphibious equipment has brought cargo from ship to the waterline. Any natural barrier which prevents access from the point of landing to the interior makes terrain impracticable for cargo handling operations under normal operating condi-

tions. In the Arctic, for example, thawed muskeg behind sand or gravel beaches is an obstacle. In Europe, cliffs along the coast are typical barriers.

Hauling supplies away from the point of rest, after they have been moved past coastal barriers, also presents serious difficulties. By definition, good road nets will not be available, as a general rule, to serve landing sites which offer few, if any, natural advantages for cargo handling operations. The ability to move supplies from cargo discharge points, in the absence of road nets, however, will be a fallout of the Army's general off-road mobility program, and does not require further comment in the present connection.

Adaptations Possible

Tracked amphibious cargo carriers are essential for negotiating swamp barriers. Future developments in the big-wheel vehicle category may provide an alternative to the tracked amphibian, but the World War II LVT is the only piece of equipment which approximates a response to this need at present. Improvement of the World War II LVT as an interim cargo carrier should be a priority development activity.

The Gordian knot approach to the problem of passing cliff barriers to inland areas is appealing. Methods of employing atomic demolitions to create ramps through cliffs to provide access from beaches should be studied.

A new family of heavy-duty amphibious cranes which can swim ashore, move up to the base of a cliff face, and lift heavy equipment to the top of the cliff would be very useful in over-the-shore logistic operations. The *BARC* appears to be a practicable base vehicle for development of an amphibious heavy crane.

In commercial practice, tramways are used generally to traverse difficult terrain. A military tramway has been developed but, unfortunately, does not appear to be the solution to over-the-shore logistic prob-

lems. The present military tramway was developed to handle the largest possible cargo loads, and ease of emplacement, lightness, and flexibility were sacrificed. Installation of the present tramway is a considerable engineering operation and the system is suitable, for practical purposes, only for semipermanent installations. It is not suitable for hit-and-run landings where maximum advantage must be taken of surprise and dispersion of effort. The same is true of present conveyor systems. Early emphasis should be placed on the development of a tramway which can be emplaced with great rapidity, notwithstanding the fact that satisfaction of this requirement will operate to reduce the effective lift capability of the device.

A mobile cargo elevator, on the endless chain principle, can be developed rapidly and at no great cost. There are many possible uses for such a device in ship loading, ship discharge, landing craft discharge, and similar activities. It would be particularly useful for moving general supplies to the top of cliffs of relatively low height, but of such sharpness as to prevent vehicle movement.

Solution of the problems of over-the-shore logistic operations in the missile age, as an integral part of the adaptation of the Army to the tactical and logistic facts of modern life, is essential to successful future military operations. Recognition that there is an over-the-shore logistic problem is the first step toward solution of the problem. Recognition must be followed by development of appropriate doctrine; modification and evolutionary development of equipment for use in the immediate and middle future; and revolutionary development of concepts and matériel for use in the longer range. These matters require early consideration not only by logistic staffs but by operations staffs if the Army is to be prepared to fight the next war in the future instead of the past—indeed, so that fighting it at all may be possible.

Rise of the Red Army Star

Wing Commander John Gellner, *Royal Canadian Air Force*
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IN THE last decade no public utterance of a political leader has been subjected to a more painstaking analysis than Nikita Khrushchev's famous attack on Stalin and his works delivered in February 1956 before a secret session of the 20th Congress of the Communist Party of the Soviet Union.

What is purported to be the unexpurgated text of this sometimes brutally violent, sometimes maudlin, sometimes clever, and in places almost unbelievably naïve speech appeared in the Western press on 5 June 1956. Since then, the question: "Why did Khrushchev do it?" has been asked ever more insistently. Various answers have been given. They run from the convincing to the plausible, to the far-fetched, to the utterly improbable.

Marshals and De-Stalinization

On one point, however, all the experts on the USSR agree: the top leadership of the Soviet armed forces, or at least the dominating faction in the top leadership, not only wholeheartedly approved of Khrushchev's vitriolic attack on his dead master, but almost certainly helped trigger it off. Most commentators see in this nothing but the desire of successful military leaders to reap the glory of the victories they won—the glory which the civilian Stalin had usurped. For these commentators the passage which explains the marshals' part in the de-Stalinization drive is that in which Khrushchev bows to the real victors

in Russia's campaigns of the Second World War:

Not Stalin, but the Party as a whole, the Soviet Government, our heroic army, its talented leaders and brave soldiers, the whole Soviet nation—these are the ones who assured the victory in the great patriotic war.

This explanation imputes to the Soviet military leaders a rather small mind, an almost childish attitude, which is not in keeping with the estimate of the mental makeup of the Russian marshals made by Westerners who came to know them during World War II. It is much more probable that in their decision to topple the idol which they themselves had helped to build for their soldiers to worship, these stern, coldly calculating, professional soldiers were moved by military considerations. From the evidence available it should be possible to deduce what these considerations were.

Revolutionary or Traditional Forces?

Lenin, Trotsky, and Stalin, the three men who above all were responsible for the creation of the Soviet armed forces, all were keen students of history. From the very beginning they were alert to the possibility of a Napoleonic coup, of a smothering of the revolution by a military leader risen from it. Their fear of a latter-day General Monck or General Bonaparte increased when it became apparent that of all the educated classes in Russia the pro-

The ascendance of the Soviet armed forces after Stalin's death and Beria's liquidation is the direct consequence of what happened after the purge of Tukhachevski and the regular officer corps in 1937

fessional officers were the only ones who, in their overwhelming majority, rejected communism and opposed the new state with arms in hand. It seemed obvious that if the revolution was to be kept alive, a new concept of command of the armed forces must be found—a concept which would give the troops efficient tactical leadership yet prevent the formation of a military caste potentially dangerous to the new order.

In considering early attempts at creating revolutionary military forces that could also fight, it merely need be said that all the measures introduced for that purpose achieved a measure of success without attaining the ultimate aim. There was the short-lived radical experiment with an army without rank structure in which responsibility alone was to assure the leader respect and obedience; the formation of the Red Army on (outwardly) conventional lines; the "hiring" of close to 50,000 Czarist officers to fight internal and external enemies in the period of civil wars, and the elimination of most of these officers once the job was done; the law by which the Soviets wanted to prevent the rebirth of an officer class by barring all but the sons of workers and peasants from becoming officer cadets; and, most important of all, the system of command through a duumvirate of military commander and political commissar, coequals in theory but, in practice, with the preponderance of power in the hands of the commissar. Yet at the time of the 17th Party Congress in 1934—generally considered the starting

point of the great wave of purges which made of Stalin the unchallenged despotic ruler of Russia¹—the Soviet armed forces were ideologically still far from the ideal of the proletarian armies for which the fathers of the Bolshevik revolution had striven.

In particular, the outlook of the professional cadres (commissioned officers and long-term noncommissioned officers) was very much that of professional soldiers everywhere, and the inevitable military caste had formed. The checks instituted to control the potentially counterrevolutionary professionals existed, but their effectiveness was doubtful. The militia of armed workers led by Party functionaries outnumbered the regular army by more than two to one and reputedly was capable of quick mobilization. However, its fighting value was negligible.

The commissars (*politruks*) and Party workers in the open, and the police agents in the shadows were with every unit but, through a subtle process of osmosis, quite a number of them had gone over to the side of those on whom they were supposed to spy. The main reason for this strange transition was undoubtedly the general intellectual superiority of the comparatively well-educated officers over the average *politruk*. This militarization of the *politruks* went all the way to the very top where their chief, the head of the Main Political Administration and Vice Commissar of Defense, I. B. Gamarnik, had fallen completely under the spell of his colleague, the other Vice Commissar, Marshal Mikhail Tukhachevski.

Boy Wonder of the Red Army

Although Kliment Voroshilov was Commissar of Defense and Tukhachevski, officially at least, held no command of troops, the latter was in fact the commander in chief of the Red Army in 1934. His had been a meteoric rise, the more extraordi-

Wing Commander John Gellner, a frequent contributor to the MILITARY REVIEW, was born in Trieste, and educated in Austria, France, and Czechoslovakia. He practiced law in Czechoslovakia until 1939 when he moved to the United States. Upon the outbreak of World War II he went to Canada and enlisted in the RCAF. Soon after the end of hostilities he received his permanent commission. Commander Gellner presently is serving on the Directing Staff, Royal Canadian Air Force Staff College, Toronto, Canada.

¹ The real bloodbath began only after the murder of Sergei Kirov a few months later.

nary because he came from an aristocratic family and when the Bolsheviks came to power he had been a lieutenant in the fashionable Semenovsky Regiment of Guards. Yet in 1920 at the age of 26, he commanded the Russian western group of armies which he led to the gates of Warsaw. He remained commander of a military district after the civil wars in a period when most of his kind were more or less unceremoniously tossed out of the Soviet armed forces. He was in virtual top command before he had reached 40.

There has been much controversy over the question of Tukhachevski's political convictions. He has been called an ideological Communist of strictest observance. The fact that during the civil wars he seemed to have sided with the radical Zinoviev wing in the Party, that is, with those who wanted to carry the revolution beyond the borders of Russia without delay, and the tone of some of his writings (for instance, his book, *Voina Klassov*) have been used as evidence of the correctness of this contention. On the other hand, it has been said that he supported the Party hotheads only because he craved command in the field and for that needed a war. Tukhachevski's complex personality perhaps has been portrayed best by Piere Fervacque, a French officer, who was with Tukhachevski in 1916 and 1917 when they were both prisoners of war in the fortress of Ingolstadt and who later wrote a little book about the Red marshal entitled *Le Chef de l'Armée Rouge*. Fervacque said of Tukhachevski:

All that he believed in had been extinguished and only one faith remained in him—the faith in Russia. The war was lost, and with it the old honor, the old morals, the old civilization. This to him was a sign that this old honor, these old morals, this old civilization no longer suited his country. Mikhail convinced himself, little by little and as the edifice crumbled, that it would be best to tear it down altogether.

It could be rebuilt later. In the meantime he would join the wreckers.

Of socialism he knew nothing. I am sure that he never saw the social aspects of the Russian revolution. Nor did he see the human, or rather the inhuman, side of it. The only value he attached to life was that of winning and he had no interest in the victims. Not that he was cruel; rather was he ignorant of the meaning of pity.

According to Fervacque, Tukhachevski was a strange combination of political Anarchist and fanatical soldier, supremely disciplined professionally, completely undisciplined socially.

Opposed Stalin Early

One thing is certain: Tukhachevski had come into conflict with Stalin very early, and as the latter never forgot and was pathologically suspicious, Tukhachevski must have been marked for liquidation for a long time. The disagreement between the two men dated back to 1920, at which time Stalin was the political commissar of the southern group of armies under Egorov. Whether it was because he opposed the Polish Campaign from the beginning or because of professional jealousy,² the fact remains that Stalin persuaded Egorov not to come to the assistance of Tukhachevski when the latter was stalled in front of Warsaw, but to invade Galicia instead.

Tukhachevski was sharply critical of the operations of Egorov's army group in his later lectures to the staff college and in numerous articles in professional journals. With much justification he laid the blame for the failure of the Polish Campaign squarely where it belonged. His standpoint was accepted fully by the official Soviet history of the war with Poland. It goes without saying that later, when Stalin had proclaimed himself the victor of the civil wars and the infallible master strategist, this history was rewritten.

² In 1920 Tukhachevski's Political Commissar, Smilga, was as influential as the then comparatively unknown Stalin.

For purely military reasons, Tukhachevski was sharply opposed to the principle of dual command that existed in the Soviet armed forces. He does not seem to have openly demanded the recognition of the undivided authority of the military commander (*jedinonachalje*), but as we have said earlier, during his tenure of the office of Vice Commissar of Defense *jedinonachalje* became the rule in practice, at least in the higher commands.

Tukhachevski also was greatly impressed with German military efficiency and with German military doctrine. He strongly supported and took the greatest advantage from the clandestine cooperation between the Red Army and the *Reichswehr* inaugurated after the Treaty of Rapallo (1922) and carried on until Hitler came to power 11 years later. There is no doubt that he wished to confer upon the Russian officer the prestige and the independence from political interference which the German officer enjoyed in the times of the Weimar Republic.

Heyday of the Commissars

The great purges had been under way for over two years when, on 12 June 1937, it was announced that Marshal Tukhachevski and seven senior generals of the Red Army had been executed. Even in that era of unrestrained terror, when nothing more could surprise the small group of Western diplomats and journalists resident in Moscow, the news of the liquidation of Tukhachevski came as something of a shock. There had been no inkling of his fall from grace or of his arrest, and no spectacular trial such as was usually staged for the accused of Tukhachevski's importance and fame.

Officially the case was dubbed the "Tukhachevski Plot," and although no full story was released, it was made pretty clear that the marshal had conspired with the German General Staff to overthrow the Soviet Government. The liquidation of Tukhachevski was followed by an all-out purge in the

armed forces. That about 30,000 regular officers fell victim to it is a generally accepted, and probably conservative, estimate. It is certain that close to 60 percent of the general officers of the Red Army were eliminated.

Was there ever a Tukhachevski Plot? Most experts on the USSR believed at that time that there was, and many still believe it. Apart from other considerations they base their judgment on a rather queer, but psychologically very interesting piece of evidence provided by a witness of highest repute. The late President Eduard Beneš of Czechoslovakia not only sincerely believed that such a complot existed but also that it was he who unmasked the traitors. According to Mr. Beneš' own account,³ the Czechoslovak Ambassador in Berlin, Mr. Mastný, learned of the plot at a party through the slip of the tongue of Count Trauttmansdorff who was connected with the German Foreign Office. President Beneš immediately informed the Soviet Ambassador in Prague, Mr. Alexandrovsky, asking him to warn Stalin. Until disillusionment came to him as to so many other Russophiles, Beneš counted on Stalin's gratitude for the service he had rendered him—a gratitude that he hoped would help him to maintain the integrity and independence of Czechoslovakia.

The old fox in the Kremlin must have chuckled at the thought that President Beneš had unwittingly, and in good faith, spread the mantle of respectability over an action which almost certainly was plain murder. It is equally certain that the information given by Trauttmansdorff was planted. To produce proof for the contention that there never was a Tukhachevski plot would be beyond the scope of this article.

From what followed the execution of Tukhachevski it is obvious that the real

³ Beneš held these views to the end, repeating them again in his article, "Omens of a New Conflict," in *Nation* of 19 June 1948, only a little more than two months before his death.

reason for the great purge in the armed forces was not the smashing of a treasonable plot (knowledge of which could not have been shared by tens of thousands of conspirators in a police state), but the elimination of the professional officers' class which, to Stalin, constituted a potential counterrevolutionary force.

Officers Merely Puppets

From the massacre of the officers the political commissars emerged as victors. Where before they had been required to countersign only operational orders issued by the military commanders, they now assumed actual tactical command of their units. As Voroshilov put it in a speech in 1939:

The commissar and the military commander represent an integral unit in directing the combat and political instruction and training of the military unit. Both are responsible for the fighting, political and moral condition, the state of supplies and living conditions, etc., of the unit. Both will lead their unit into battle. . . .

In practice the cowed professional officers, glad to have saved their necks during the purges, readily left all decisions to the commissars. Ironically, Tukhachevski's goal of *jedinonachal'ye* had been achieved, with the only difference that the sole authority now rested with military dilettanti.

The new order was put to a test within a year after the great purge in the armed forces. In August 1938 in Manchuria, the first battle of modern times (and the last, except for some further clashes that occurred in the following months in the same general area) was fought in which an amateur was in actual tactical command of one of the opposing armies and emerged the victor. This unique specimen was Army Commander of Second Rank Stern who commanded the First Special Red Banner Army when it was attacked by the Japanese at Changkufeng Hill and Lake Hassan.

Stalin's Analysis Wrong

As this victory confirmed Stalin in his conviction that he was running lesser risks if he chose military commanders for their political reliability than for their professional ability, perhaps it was inevitable that he should draw the wrong conclusions from Stern's success. He failed to appreciate the fact that Stern had fought a defensive battle, and that the battle had been fought from positions chosen and prepared before the purge by professional officers.

This was a special case which, in reality, proved nothing except that Russian troops could be trusted to stand their ground with tenacity—and that had always been known. That the commissars were incapable of commanding troops, and that there would be no more Changkufeng hills, Stalin learned when he went to war again, this time against Finland in the winter of 1939.

Ups and Downs

Khrushchev has accused Stalin of having brought about the heavy initial defeats of the Russian armies in 1941 through his stubborn refusal to allow war preparations which might provoke the Germans. But could Stalin have acted otherwise?

The failure of his new order in the first Russo-Finnish War had put him between the devil and the deep blue sea: on one hand there was the certainty of being defeated in any future war with a first-class power (and wars with Germany and Japan were distinct possibilities in the spring of 1940) unless he brought back the surviving experts to lead the Soviet armed forces; on the other hand there was his fear that his régime might be destroyed by the officers he had rehabilitated.

In the end, Stalin went as far as he thought he could, safely: he again took from the commissars the power to direct operations which he had conferred upon them in 1937 and, at least theoretically, subordinated the commissars to the military commanders. He fished out of the gaols

as many of the victims of the military purge as he could find alive,⁴ but he also strengthened the clandestine police apparatus in the armed forces, and let the professional officers know that while they were again in command, they were also under close supervision.

The task of restoring the fighting efficiency of armed forces which had been commanded ineptly for three years and whose officer corps had been dangerously thinned out, was, of course, prodigious. The situation was bad enough in the army—it was worse in the air force. There, between the purge and the German invasion, four commanders in chief, Generals Alksnis, Loktionov, Rychagov, and Smushkevich, were liquidated one after the other, in less than four years. Small wonder that the Red Air Force entered the war totally disorganized and that, despite its huge numbers, fine pilots, and good equipment, it was swept from the skies by the numerically weaker Luftwaffe. In fact the air force never fully regained its balance during the war, and never lived up to its potential capabilities. In a technical service, which as far as experience was concerned had a weaker base than the Red Army, the physical and psychological wounds inflicted by the purges simply could not be healed in a matter of five years.

Thus Stalin was forced to play for time. But as he had only a respite of 15 months between the end of the first Russo-Finnish War and the German invasion, and as he never could make himself go all the way in reestablishing the authority of the professional officers and in giving them his confidence, Russia staggered to victory after suffering some crushing defeats and after a truly appalling blood-letting.⁵ But

for Hitler's interference with the conduct of operations and German political ineptness, particularly in handling the non-Russian nationalities of the USSR, the Soviet Union probably would have lost the war.

Stalin, of course, could not admit that Russia had been on the brink of defeat nor could he allow an inquiry into the reasons of Russian military failures, for any such investigation inevitably would have resulted in an indictment of his own policies. And so he created the myth of the great patriotic war: under his own brilliant leadership the Soviet armed forces had marched from victory to victory; Soviet military doctrine, strategy, tactics, equipment, and morale had been the best; the Soviet Union, and in the last analysis he himself, had won the war singlehanded.

The Marshals Are Worried

No one who has met the Soviet top commanders of World War II has called them fools; therefore, it is not likely that these capable professional soldiers could have found any grounds for complacency when they reviewed the events of the war which they won. They probably proposed to do what any military leader would do who has just squeezed through a campaign which he was within a deuce of losing—find out what went wrong, learn himself, and make others in his service learn the true lessons of the past campaign. This, however, the Russian commanders were forbidden to do. A doctored, wholly unrealistic account of the war was written, and became the basis of strategic and tactical studies at the military colleges. The standard work for the professional training of regular officers became Stalin's *O Velikoi Otchestvennoi Wojne Sowjetskego Soyuza* (*About the Great Patriotic War of the Soviet Union*), a hodgepodge of the dictator's utterances and writings between 1941 and 1945, and a book of some historical but no military value. The great man who had made himself the leading expert in so many other

⁴ Of these, Khrushchev, in his famous indictment of Stalin, mentioned Konstantin Rokossovski, Kirill Meretzkov, and Gorbakov, the first two now marshals, the last-named a colonel general.

⁵ The extent of this blood-letting was revealed when the results of the 1955 census were published, fixing the population of the USSR almost 10 percent lower than Western demographers had estimated it to be.

fields, from politics to biology and literature, also proclaimed himself the greatest military theorist. In October 1950, *Izvestia* defined the new Soviet military doctrine as:

The military science created by Comrade Stalin is an entirely new military science which deals not only with the art of war proper, but also with the economic and moral potentialities of our own and of enemy countries.

Soviet military leaders must have watched with horror how the young generation of regular officers was brought up not in the light of critical inquiry into military problems, but in the murky darkness of Marxian determinism. With the emphasis on the inevitability of the victory of socialism and on the superiority of Soviet man over all others, went a complete ossification of military thinking. After all, what did it matter what weapons were used and how if the Marxist dialectic itself was proof of ultimate victory?

Control Based on Spying

Other danger signs appeared on the horizon to become oppressive realities as the years of peace went by. The political commissars were never restored to the eminence which they had attained in 1937, but the two unit organizations entrusted with the close control of the military (and, incidentally, with spying on one another)* were greatly developed and strengthened. Both had direct channels of communication which bypassed the military chain of command and led to their own higher headquarters. The Political Sections reported through channels to the Main Political Administration which, in turn, was responsible to the Secretariat of the Central Committee of the Party. The counterintelligence sections reported to the Minister of State Security, the administrative head of

Beria's police empire (in the last years before Stalin's death, General Abakumov).

Not only the life and liberty of the military commanders, but even their appointments and promotions soon became dependent wholly on the reports which flowed through these nonmilitary channels. There were two even more ominous portents. First, a component of Beria's police had grown into a strong second military force of all arms, something like the Nazi *Waffen-SS*. Because they always were under arms and equipped with modern weapons, these police units were infinitely more effective than the party militia of the twenties and thirties. Second, a new great wave of purges had got under way and was touching the fringes of the military establishment.

Purges had, of course, been carried out regularly even after the great bloodbath of 1935-38. They were, however, generally minor affairs, and as they had become something of an institution in Soviet life, they drew little notice. As an example, Marshal Aleksandr Novikov, who had commanded the Soviet Air Force with distinction throughout the Second World War, was jailed in 1946; there was another sharp purge in the ever-ailing air force in 1948-49. But the great purges of the late thirties were something else again. During these purges whole groups of Soviet society were deliberately eliminated. This distinguishing feature only reappeared in the great purges of Stalin's last years, like in the purge of the *Zhdanovites* (the *Lenin-grad Affair*) and of the *cosmopolites* mainly, the Jews; the *Doctors' Plot*). Toward the end of 1952 it looked as if the regular officers' corps might well be next on Stalin and Beria's list.

Victory of the Military

It would be idle to speculate whether Stalin died just at the right moment or was helped in his demise as were so many despotic rulers of Russia before him. Some interesting facts have been brought out in

* The Political Section (*Politchast*) of the Deputy Commander for Political Affairs (*Zampolit*) and the Special Section of the Counterintelligence Officer.

support of the latter theory, but for our purposes it is enough to state that Stalin's death must have been most opportune for the Soviet military leaders.

After having lived for years in fear of imminent liquidation, they became some of the most powerful men in the Soviet Union within a little over three months of the death of the dictator. Their sudden rise to power was the result of the internal struggle for Stalin's succession, the first round of which ended with the liquidation of Beria and the breaking up of his police empire in the summer of 1953. Because the private armed forces of the police boss had by then grown to several hundred thousand men in organized units, the anti-Beria faction had to turn to the only force that could win for it if civil war came—the Red Army. The marshals responded with alacrity. Beria's empire was found to be a colossus on feet of clay. And the military leaders settled accounts outstanding since 1937. Beria himself was tried and condemned to death by a special board of the supreme court with Marshal Konev presiding.

The Complete Reversal

The liquidation of Beria was an event of greatest significance, not only for the Soviet armed forces, but for the Communist Party of the Soviet Union and for the Soviet state. For the first time in the history of the state, the army had been called in to crush a segment of the Party. This was a complete reversal of the power relationships which, up to then, had existed in the Soviet régime.

It is quite obvious now that the military leaders demanded and received payment for services rendered in the Beria crisis. In their demands they were guided by the warning voice that called to them from the graves of Tukhachevski and the other victims of the great purge of 1937: never again let a situation arise in which army leaders will be powerless in the hands of the Party.

If the Soviet military leaders responded to this call *de profundis*, they were not guided only by self-interest—a few of them are said to be ideological Communists, all of them probably are loyal to the régime—but mainly by patriotism. They had seen into how hapless and shameful a state of inefficiency the Soviet armed forces had fallen in 1941, and they were determined not to let that happen again.

To this end, as the most important reform, *jedinonachalye*, the principle of the sole authority of the military commander, at long last was firmly established at all levels. At the top, Marshal Zhukov, Minister of Defense, is the undisputed head of the military hierarchy. As an alternate member of the Presidium of the Central Committee of the Communist Party he sits also on the highest political body, the first time that a career officer has reached this position of supreme power in the Soviet state. By contrast, General Shel'tov, who in late 1956 was the chief of the Main Political Administration, was not even a member of the Central Committee. In the units, the *Zampolits* have been reduced to the status of education-cum-welfare officers, albeit with wider powers than their opposite numbers in the armed forces of the Western Powers.

Military Thought Encouraged

Undoubtedly police agents and informers still are numerous in the units, but they seem to have been forced to operate entirely clandestinely. In the theoretical field, the Stalinist military science has been scrapped. Military problems are being discussed freely and even heatedly in the professional press. Even heresies which in Stalin's time would have led to the immediate liquidation of the author and probably of the whole editorial staff of the periodical which published them have been printed—heresies such as the statement that because of the high state of technological development in the Western countries, and the effect that surprise has in

modern warfare, Russia could under certain circumstances lose a war with the West.

All this does not mean that freedom of speech has come to the Soviet Union—it has not—but it does show that the Soviet military leaders are trying to create an atmosphere conducive to independent thought and thus to military efficiency, and that they now have the power to do so.

This brings us back to February 1956 and to Khrushchev's famous indictment of Stalin. Seen from the point of view presented in this article, several paragraphs of the Khrushchev speech devoted to the great purge of 1937 and its military conse-

quences appear as a public and official approval of the changed status of the Soviet armed forces in the Soviet state.

It may not be the end of the bloody struggle waged for 38 years for the emancipation of the forces from the Party in military matters, but just as 1937 was the high point of the Party's fortunes in that struggle, 1956 marks the so far highest point of success for the professional soldiers. These two dates are closely linked. What happened in the Soviet armed forces after Stalin's death and the liquidation of Beria is the direct consequence of what happened after the purge of Tukhachevski and the regular officers' corps.

In evaluating the world situation today, how could any reasonable person conclude that the seriousness of the Communist threat has abated, despite the new emphasis Soviet leaders choose to place upon "parliamentary procedures" to attain their ends? The Communists have ample reason to know that the free world will not be intimidated by force. They apparently have come to the realization that their military threats and overt aggression have served only to cement the free nations into the most powerful structure of collective defense ever erected. Accordingly, they have elected to change their strategy for the moment, and have put on a mantle of pseudobenevolence. We must not allow ourselves to be deceived. Whatever devious course the Communists may choose to follow, we can be sure their goal remains unchanged—the complete subjugation of the whole world to the Communist tyranny. How could America afford to let down her guard in any particular?

In addition to the military aspects, the Communists use every weapon of subversion, propaganda, and duplicity as a tool of conquest. They attack on every flank. We must not forget that our ability to build and maintain the military power which will see us safely through this age of peril is founded upon America's spiritual strength, our economic integrity, and the soundness of our Government.

Secretary of the Army Wilber M. Brucker

FORECASTING IN STRATEGIC INTELLIGENCE

Brigadier General Washington Platt, *United States Army Reserve, Retired*

The Fog of the Future
*Nor can the wisest wizard guess
What will befall in Lyonesse,
When I set out for Lyonesse
One hundred leagues away.*

ALL forms of intelligence have a lively interest in the future.

In combat intelligence the interest is almost always in the near future, whereas in strategic intelligence we often look farther ahead. Realizing the tremendous changes that the future may bring—whether in weapons, industry, or politics—and the necessity to prepare for such changes, there is an increasing need to attempt to peer farther and farther into the future—even to a point 25 or 50 years ahead.

In many cases where the terms of reference refer to the present it is really the near future in which we are interested, rather than in the actual present. All planning is, of course, for the future. As E. E. Schwien states: "The idea of 'what is' would have little importance if it did not contain in embryo the idea of 'what is to be'." Another writer expresses this vividly when he says: "The present (with its accumulated past) influences the future."

The "fog of war" has been properly justified as an ever-present factor in combat. Just as real for intelligence is the "fog of the future." It is a rather thin, but all-pervasive fog. We can see near objects quite clearly, but at greater distances our vision is definitely impaired.

In strategic intelligence production the

tremendous uncertainties which are always introduced by the fog of the future usually have been underestimated. Surprisingly little has been done to improve methods for piercing this fog, except in a few isolated cases.

One intelligence officer has commented interestingly on this situation:

It is thus the 'fog of the present' that bothers me more than the 'fog of the future,' for the first problem is to understand what is happening now. . . . The intelligence officer is charged with a task which no historian (academic, that is), would tolerate, viz., writing history as it occurs, in that wholeness of the present in which the past and future are blended in the din and confusion of becoming. One may have a foretaste of the kind of thing that will happen, but not of the particular form it will take.

The fog of the future acts as a constant threat tending to becloud the crystal ball of intelligence. But there are methods for overcoming this threat, at least in part.

In the physical sciences, conditions are generally reproducible. When we say that some theory enables us to "predict" what will happen, we really mean that it will enable us to say what *always* does happen. Our knowledge is just as applicable to the results of a physical experiment performed 10 years ago as one 10 years hence.

The confusion in the meaning of "prediction" between the physical sciences on one hand and human situations on the other is so important to those seeking to clarify their ideas on intelligence forecasting that some specific examples are justified. J. G. Smith and A. J. Duncan say:

For one of the objectives of science is, precisely, to forecast. . . . Every scientific law is, in a certain sense, a forecast. It

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foretells what will happen under certain conditions. The law of gravitation says, for example, that if a ball is dropped from a tall building it will fall with an acceleration of 32 feet per second per second.

Certainly the "law" of gravitation was equally legal in the past as in the future. Although the quoted sentence and thousands like it are given in the future tense they really mean that a falling ball *always* does have a certain acceleration—without any distinction whatever between past, present, and future.

The so-called "predictions" in the physical sciences have nothing of practical usefulness in common with predictions or forecasts in human affairs. To speak of them in the same terms leads to confusion by lumping together subjects which are superficially similar, but fundamentally different.

Five Fundamental Factors

We try to make an intelligence forecast as specific and as accurate as possible, but we do not expect or require 100 percent accuracy. In a related field, C. B. Marshall says: "Not perfection but utility is the test of planning in a foreign policy" and M. J. Moroney states: "What we seek is not a perfect description but an adequate one."

Considering strategic intelligence forecasting's vital importance to national security, surprisingly little has been done toward a constructive and critical study of

ods will be any better next year than they are today.

In a systematic study of what little is known about forecasting, five fundamental factors stand out. These have been summarized in the table on page 45.

Factor 1.—Adequacy, reliability, and precision of data and assumptions.

All forecasting starts with the data available. Estimates of the future of a given situation are founded upon knowledge of its present, and are influenced by knowledge of its past.

For intelligence production the value of data which are sufficient in coverage, in reliability, and in precision needs no further argument. There is no substitute for good data.

In intelligence, data are seldom what we would wish in all these respects. The intelligence officer must form some opinion as to their adequacy and should make this plain to the reader.

Closely related to actual data are the assumptions which are made explicitly or implicitly as a beginning for every forecast. J. M. Firestone says:

Any forecasting or prediction must be based on a set of assumptions, which if correct, will permit an accurate or reasonably accurate forecast. If premises are false, no matter how accurate are the facts on which the forecast is based, the forecast will be incorrect. . . . Statistics provide an aid for forecasting, but not the means.

It is becoming more and more important for the strategic intelligence officer to provide sound forecasts. His success may depend on his capability in applying the five fundamental factors outlined here

forecasting methodology in the intelligence field. As each problem comes up the best methods known at the moment are used; but little has been done in the way of basic research aimed at the improvement of intelligence forecasting methods. So there is little reason to believe that meth-

A better result can be achieved with the aid of statistics, but everything, in this final analysis, depends upon the basic assumptions.

Factor 2.—The spirit of the people.

The second factor in a forecast is a knowledge of the spirit of the people in

the area involved. In simple language: What kind of people are they?

This is one of the intangibles which cannot be well expressed in figures, so it is apt to be overlooked in favor of tangible facts such as tons of pig iron or rounds of ammunition. Yet this factor plays a vital part in any forecast. Furthermore, it is really comprehended only by those who have made a deep study of the area and its culture. It is so different in nature from data on weapons, pig iron, or population that it is treated separately here.

The spirit of the people includes such decisive questions as: Are they decadent, disillusioned, and disunited; or are they aggressive, progressive, optimistic, and imbued with the will to win? Do they quit easily, or do they fight to the end? Are they good neighbors, or are they quarrelsome and untrustworthy?

It is in the spirit of the people, as much as in matters of economics or political science, that the explanations to quick surrenders are found, as contrasted with the fight-to-the-end attitudes in World War II, the industrial recovery of West Germany since 1946, and many other developments which will occur to any reader.

History provides many examples of groups which, with an overpowering will to win, have accomplished the well-nigh impossible. On the other hand, other groups

equipped with every physical and mental advantage but imbued with a spirit of disunity, cynicism, or lack of public spirit have failed to an extent that is almost unbelievable. One need look no farther than the achievements of France in World Wars I and II respectively.

In forecasting, there is no single factor as important as the spirit of the people.

Factor 3.—General principles of forecasting.

Having discussed the necessary knowledge in the form of data, assumptions, and the spirit of the people, it is time to look for general principles which will help develop methods for using this knowledge.

Are there any general principles of forecasting which are widely applicable to forecasting in general and which could profitably be studied, improved, and applied to strategic forecasting? If such principles exist, or can be developed, they would justify study by all who are engaged in forecasting.

The general principles applicable to many kinds of forecasting are surprisingly few and of two kinds: first are three general forecasting principles which may apply to any kind of a forecast including onetime situations such as the results of an election, the outbreak of war, or the development of a specific weapon. These principles are:

Causative Forecasting

Analogue Forecasting

Applications of the theory of probability to forecasting.

Next are those principles which apply only to a continuing situation that can be shown by a graph with time as the independent variable. Examples are prices, employment, or population. Such principles are:

Persistence Forecasting

Trajectory Forecasting

Cyclic Forecasting

Principles With Over-all Applications

Causative, Analogue, and Probability Forecasting are in no way conflicting. In

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THE FIVE FUNDAMENTAL FACTORS IN FORECASTING

In any successful intelligence forecast the following five factors—widely different in nature—cover the principal aspects.

The author must start with the following:

Necessary Knowledge

Factor 1.—Adequacy, reliability, and precision of data and assumptions.

Factor 2.—The spirit of the people concerned. What kind of people are they? (culture, progressiveness, the will to win)

With this knowledge he develops methods for forecasting from the following:

General Principles

Factor 3.—General principles:

- a. With over-all applications:
Analogue, Causative, and Probability Forecasting.
- b. For continuing situations:
Persistence, Trajectory, and Cyclic Forecasting.

Skillful utilization of the necessary knowledge, by methods developed from the general principles, then depends upon:

Competence on the Part of the Author

Factor 4.—Understanding of the natural and social sciences involved.

Factor 5.—Creative ability and intelligence judgment (education, experience, disciplined imagination, maturity of intelligence judgment, and, where possible, wisdom).

A certain minimum achievement in each factor is required for usable results. Beyond this minimum an improvement in any one factor will, in turn, improve the final forecast. Only high achievement in *all* factors can lead to an excellent forecast.

fact it will be common in a given problem to utilize help from all three in arriving at the final conclusions.

Causative Forecasting gives first priority to the underlying causes of the action under study when drawing conclusions about the future. It is applicable to one-time events such as a revolution, the outbreak of war, the collapse of a dictatorship, as well as to a continuous series of events, such as population figures. Causative Forecasting requires a real understanding of many factors and intelligence officers of broad experience because it greatly enlarges the areas which must be searched for clues. Events quite remote from the field of interest or remote geographically may have decisive effects. Like other methods, it includes an interest in indicators which could act as warnings of the impending action.

As a specific intelligence example consider the problem: Will a given dictator who has seized the power in Arkadia be able to maintain himself in power for the next three years? In attacking this from the causative point of view it would be wise to seek answers to questions such as:

What were the causes of the unrest which led to the overthrow of the government preceding that of the present dictator? What are his present sources of power and support? Are these sources increasing or decreasing? What persons or parties would like to oust him? What are the sources of power and support of this opposition? What type of difficulty (such as crop failures, dissolution of a coalition, or opposition of a foreign power) would probably endanger or cause the fall of the regime of the present dictator? Is there one key factor which probably will be decisive?

By an understanding of the actual working of the situation under study and the causes for success or failure, attention is focused on the key factors and the picture of the probabilities often becomes clear.

In Causative Forecasting a prominent

place is, in fact, often held by identifying the key situation.

The social sciences often render crucial service to the intelligence officer by pointing out the key situation (that is, in an election, in battle, or in the progress of an idea) on which the final result hinges.

For example, in the presidential campaign of Charles E. Hughes *versus* Woodrow Wilson, Hughes was the favorite. It was said that he lost the campaign because, when he was electioneering in California, he failed to walk across the room to shake hands with Johnson, the Republican leader in California. Johnson's feelings were hurt. He gave lukewarm support to Hughes. As a direct result of this, Hughes lost the electoral votes of California, and, as a further result, he lost the national election.

It is said also that political scientists could have pointed out with confidence that the election would hinge on California and that the California results would depend upon the personal support of Mr. Johnson, even if they were unwilling to predict what action Mr. Johnson would take. It is fair to assume that if political scientists had pointed this out to Hughes in such a way as to convince him, his actions would have been different.

Similarly, in a battle or in any other situation covered by intelligence forecasts, if anyone can point soundly and convincingly to the key situation, he makes it possible to concentrate attention at that point, and so assists in the forecasting. Evidently a statement of the key situation on which the election, battle, or social effort hinges requires a knowledge of the other parts of the picture also, and assumes that the other election units or the other parts of the battleline will perform as expected.

Analogue Forecasting, using the principle of analogy, starts with a study of what has happened in similar situations which are more familiar than the given problem.

This is going from the known to the unknown. Under this principle the forecaster

draws heavily on accumulated knowledge of the social sciences.

The danger of this principle is that it is nearly always appealing and convincing, but it is *not* nearly always reliable. Situations superficially similar may be quite different in the crucial points.

Plausible reasoning by analogy requires no knowledge of anything except a little history, so analogue forecasting often is useful as a start, particularly when other means are unavailable.

Probability Forecasting. The one other general principle applicable to nearly all intelligence forecasts is the great theory of probability. For intelligence production purposes the author agrees with Mosteller and Bush: "A major goal for the statistical training of students should be statistical thinking rather than statistical formulas. . . ."

Principles for Continuing Situations

Persistence Forecasting. In this effort the forecaster starts with the assumption that unless there is positive evidence to the contrary, the future, within the limit of the forecast, will be substantially similar to the present.

A danger arises where changes are slow and gradual and without overt evidence which attracts attention to the changes. Such changes may be quiet but profound. They are likely to be overlooked except by deeper students.

One example of such a gradual change is the growth of the Nationalist movement in the countries of North Africa. Another may be considered the decline of the military capabilities of the French in the 1930's.

Such quiet, below-the-surface movements are evident to real experts. This is another argument for continuity of effort and professional competence in intelligence production.

Any assumption of "no change" should be examined critically, although change (whether political, economic, or techno-

logical) has become increasingly frequent and rapid in modern times.

Trajectory Forecasting is used where there is a definite trend upward or downward and it is assumed that the curve will continue in the same direction for the period of the forecast unless there is evidence to the contrary.

With the modern prevalence of graphic aids and curves on charts, this sort of forecasting is common—perhaps too common. Such curves, with time as the independent variable, depict population, numbers of college graduates, pig iron production, imports, expenditures, and almost every conceivable item that is measurable or pseudo-measurable.

There is a natural tendency to assume that a curve which has continued in one direction for a number of years will continue in the same direction for a number of years more. If the curve is upward, a generally optimistic philosophy of "bigger and better," makes Americans particularly apt to follow the trend upward into the future farther than is justified.

Suppose Curtania's capabilities in some measurable respect are considerably below those of the United States. Suppose that for the last several years Curtania's capabilities have been increasing at a greater rate than those of the United States, but still are considerably below us. Suppose finally that the forecaster wishes to "point with alarm" to this condition and to imply that this situation "perils" the US national security. All that is necessary is a public statement: "If this trend continues . . ." the condition will be almost anything the forecaster wants to make it.

He is mathematically correct if the trend continues at the present rate over the period necessary for the peril to materialize. The practical point here is the condition: "If this trend continues. . . ." Everything that follows depends upon this condition.

The public, hearing such a statement, nearly always assumes that the author of it believes that this trend is likely to con-

tinue, and hence that the peril will occur in the foreseeable future. No author should make such a statement without including his own belief as to whether the trend will continue. No reader should swallow such a statement whole.

An amusing example of carrying a trend to its logical conclusion in both directions, which may help the reader remember this point, is taken from Samuel Clemens' *Life on the Mississippi* written in 1874:

In the space of 176 years the lower Mississippi has shortened itself 242 miles. That is an average of a trifle over one mile and a third per year. Therefore, any calm person, who is not blind or idiotic, can see that in the Old Oolitic Silurian Period, just a million years ago next November, the lower Mississippi River was upward of 1,300,000 miles long, and stuck out over the Gulf of Mexico like a fishing rod. And by the same token any person can see that 742 years from now the lower Mississippi will be only a mile and three-quarters long, and Cairo [Ill.] and New Orleans will have joined their streets together, and be plodding comfortably along under a single mayor and a mutual board of aldermen. There is something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact.

As is well known from a study of the natural or social sciences or from practical experiences, few trends or curves do continue in substantially the same direction for very long. There are some general conditions which may cause a rising curve to continue to rise at an ever-increasing rate for a time (the so-called exponential or logarithmic curve). The best known is the compound interest curve or the rate-of-growth curve.

This same tendency to grow faster and faster based upon a rate of growth is seen dramatically in a forest fire which spreads out in all directions, or in the case where every customer (or convert to communism)

gets one new customer every week. This sort of rapid and pyramiding growth is common in the early stages of an expansion.

But there also are influences which tend to hold such growth in check. As a matter of fact, no investment ever has grown to infinite proportions in spite of the compound interest curve of ever-increasing growth. No forest fire has ever wiped out all the forests on the earth.

Acting in the opposite direction there is the well-known and fundamentally important Principle of Le Châtelier by which growth tends to check itself. This was first developed in the natural sciences and later extended to the social sciences. For example, unrestricted growth in population, when confined to a given area, produces overcrowding, starvation, and disease all of which act as deterrents to a further increase in population. A continual rise in prices restricts buying, increases production, and thus slows the rise. In general the momentum of any aggressive human movements tends to die down. Nations which rise do not continue to expand until they encompass the globe. However, neither the Principle of Le Châtelier, nor Toynbee, can tell us whether the downward turn will occur in a few years or a few centuries. So this principle is one which the forecaster should always have in mind, although he usually cannot make specific use of it without much additional evidence from other sources.

Cyclic Forecasting. Many movements, other than tides, ebb and flow. Prices rise and fall, and business goes up and down in irregular cycles as do the fortunes of political parties. Cyclic forecasting is in part based upon the assumption that history to some extent repeats itself, that is, activities which have gone in cycles will continue to do so.

Cycles in human affairs generally are caused by the built-in correctives to extremes of human action described under trajectory forecasting. Thus an aggressive,

militant, political party becomes soft and corrupt with continual success, opening the way to its own downfall.

The author knows of no cycles of human activity which proceed with sufficient regularity to make possible even rough predictions solely on the basis of the cyclic period, although a knowledge of this period is useful when combined with many other factors. Furthermore political, economic, and social conditions change rapidly, so that the cyclic pattern which existed over the last 50 years in any field of intelligence interest will almost certainly be seriously modified in the next 50 years.

Having discussed the necessary knowledge, and the general principles for handling it, it is time to consider the competence on the part of the author which will permit him to produce the most reliable forecasts humanly possible in the given situation.

Factor 4.—Competence in natural and social sciences.

Competence in the disciplines concerned is the fourth of the fundamental factors for forecasting. For example, in forecasting prices, industrial production, or employment the forecaster deals with economic operations. If he is competent in economics, he handles the questions involved with a sure hand. If not, he is merely a beginner and cannot expect the full success due the expert.

Factor 5.—Creative ability and judgment of the author.

The fifth and final fundamental factor in a successful forecast is the creative ability and good judgment of the author in putting this mass of data, this understanding of the spirit of the people, these principles of forecasting, and the knowledge of the natural and social sciences into a meaningful whole, showing the causative relations between the parts. His good judgment selects the key factors for emphasis. Such a person must have knowledge, judgment, and wisdom.

This over-all professional competence, essential for first-rate forecasting, is of three quite different kinds, achieved at different times and places:

First, knowledge of the natural or social sciences which are principally involved in the forecast. This is the kind of knowledge derived from education and higher study.

Second, knowledge of intelligence methods and of the area concerned, derived principally in the course of intelligence work.

Third, the judgment and wisdom which come to some from many years of experience, mature thought, and discussion.

In all of these respects the requirements for producing a strictly first-class professional intelligence officer are essentially the same as the requirements for producing a strictly first-class professional in the fields of law, medicine, or military art, namely, a first-class education, experience in his profession, and natural ability.

Conclusions

Forecasting is filled with doubts and difficulties. No method exists or is in sight by which forecasts can be made with certainty or near certainty. The fog of the future remains.

In spite of the uncertainties, forecasts upon which are staked money, national security, or professional reputations *must* be made and are constantly being made in business, diplomacy, politics, and strategic intelligence.

Like other human activities, substantive knowledge, grasp of the most reliable methods, and judgment born of experience greatly increase the chances of success.

The five fundamental factors in forecasting have been selected as the most helpful out of what has been written on forecasting in human activities.

A study of these factors and other writing on the subject will be worthwhile for intelligence officers—particularly those involved in producing strategic intelligence.

CONFIDENCE

The Surest Pledge of Victory

Captain Ira A. Hunt, Jr., *Corps of Engineers*
United States Lake Survey, Detroit, Michigan

THE United States Army has dissected each of its campaigns and has distilled recorded history to develop its principles of leadership, yet many of these principles were refined and defined some 450 years ago by the words and deeds of two contemporary leaders of the 15th and 16th centuries—Niccolò Machiavelli and Cesare Borgia. Who were these men who stand out in all of history as two of the most powerful and famous practitioners of the art of leadership?

Machiavelli, the father of power politics and the deviser of a new political theory, is, perhaps, the most influential writer on politics the world has thus far seen. Famous as a diplomat, historian, and philosopher, rarely has he been described as a militarist. Yet more than one-third of his famous works, *The Prince* and *The Discourses*, are devoted to questions concerning war and the conduct of generals. He outlined the science of tactics and wrote the first of the modern classics on military subjects, *The Art of War*.

Machiavelli, who later was to write: "The chief foundations of all states, whether new, old, or mixed, are good laws and good arms," was born in 1469 of middle-class parents in Florence. Throughout his life his only compelling interest was politics. In 1498, at the age of 29, he was appointed Chancellor and Secretary to the Florentine Council of War, a position he held until the fall of the Florentine Republic in 1512. During this period he headed legations to every important city-

state of Italy and the powers of France and Germany, assignments which gave him intimate behind-the-scenes knowledge which he used as the first modern analyst of power.

A Leaders' Leader

It has been said, "The authentic interpreter of Machiavelli is the whole of later history." The impact of *The Prince* on modern statecraft has been tremendous. Kings Henry II and Henry III of France had a copy of *The Prince* on their persons when they died. Frederick the Great, Napoleon, Mussolini, and Stalin studied the book. Historian Hermann Rauschning relates from his conversations with Hitler that Machiavelli was one of the influences shaping Hitler's thought, and that the Nazi dictator was in the habit of keeping a copy of *The Prince* at his bedside.

Although today his name often is used to denote political cunning and bad faith, there was nothing devious or dishonest in his search to discover in history universal laws of cause and effect. Far and away the most famous of Machiavelli's principles of politics is the proposition that a good end justifies what is morally wrong, that is, the end justifies the means. Thus recognizing the basic conflict between political and moral virtue, he lauds the use of fraud in the conduct of war and diplomacy, contending that one's country should be defended in any way whatsoever. Politics is, therefore, the art of creating, protecting, and strengthening a state.

Machiavelli also states that the ultimate

reliance of all governments, whether despotic or republican, is on mass consent. The best method of unifying the mass is by a national religion that can be used by the state for political ends.

How well the above principles mirror the Russian tactics of today in worldwide as well as in domestic political maneuvers.

Machiavelli concluded that a national army is the true military strength of a nation. He extols the martial state. Claims he, "money is not the sinews of war, as it is commonly supposed to be. . . for war is made with steel and not with gold." Throughout his works one of his main theories is that neither a state nor an army could survive unless there was strong and able leadership. Again and again he stresses the vital role of leadership.

Confidence Is Keynote

Machiavelli penned some of the most expressive and pithiest statements on leadership when he wrote:

To make an army victorious in battle it is necessary to inspire them with confidence, so as to make them believe that the victory will be theirs under any circumstances. But to give an army such confidence they must be well armed and disciplined, and the men must know each other; such confidence and discipline, however, can exist only where the troops are natives of the same country, and have lived together for some time. It is necessary also that they should esteem their general, and have confidence in his ability; and this

Many of our present principles of leadership were refined in the 15th and 16th centuries by Niccolò Machiavelli and Cesare Borgia—two of the most powerful and famous practitioners of the art of leadership

will not fail to be the case when they see him orderly, watchful, and courageous, and that he maintains the dignity of his rank and reputation. All this he will do by punishing faults, by not fatiguing his troops unnecessarily, by strictly fulfilling his promises, by showing them that vic-

tory is easy, and by concealing or making light of the dangers which he discerns from afar. These maxims well observed are the best means of inspiring the troops with that confidence which is the surest pledge of victory.

In his works Machiavelli has discussed at length most of the leadership principles propounded by our Army, perhaps not in the same words, but definitely in the same content. A few of these leadership principles are:

KNOW YOUR JOB

"A prince should, therefore, have no other aim or thought, nor take up any other thing for his study, but war and its organization and discipline, for that is the only art that is necessary to one who commands. . . .

"He ought, therefore, never to let his thoughts stray from the exercise of war; and in peace he ought to practice it more than in war, which he can do in two ways: by action and by study. As to action, he must, besides keeping his men well disciplined and exercised, engage continually in hunting, and thus accustom his body to hardships; and meanwhile learn the nature of the land, how steep the mountains are, how the valleys debouch, where the plains lie, and understand the nature of rivers and swamps. To all this he should devote great attention.

"But as to exercise for the mind, the prince ought to read history and study the actions of eminent men, see how they

acted in warfare, examine the causes of their victories and defeats in order to imitate the former and avoid the latter. . . ."

SET THE EXAMPLE

"From the words which Titus Livius makes him say, we may note what a general should really be in whom an army

could have confidence. These words were as follows: 'Consider, then, under whose lead and auspices you are about to go into battle, and whether he to whom you are listening is merely a magniloquent orator, terrible only in words; or whether he is skilled in military matters and himself able to deal blows, to lead on the banners, and to combat in the thickest of the fight. I want you to follow my actions, and not



Niccolò Machiavelli

merely my words; not my orders only, but the example of him who by his right arm has thrice achieved the consulate and the highest glory.' These words, well considered, will teach any one how to bear himself so as properly to fill the position of general. . . ."

SOUND, TIMELY DECISIONS

"In connection with this war between the Latins and the Romans, and its origin,

Captain Ira A. Hunt, Jr., was graduated from the United States Military Academy in 1945. His assignments include service in Germany and Trieste; as instructor in the Department of Mechanics at USMA; and as an exchange instructor in the Department of Marine Engineering at the United States Naval Academy. He received his Master's degree at Massachusetts Institute of Technology in 1950 and a degree as Doctor of the University of Grenoble, France, in 1954. Upon graduating from the 1955-56 Regular Course of the U. S. Army Command and General Staff College he was assigned to the United States Lake Survey, Detroit, Michigan.

we should observe that it is well in all deliberations to come at once to the essential point, and not always to remain in a state of indecision and uncertainty.

"And it will always happen that in doubtful cases, where prompt resolution is required, there will be this indecision when weak men have to deliberate and resolve. Slow and dilatory deliberations are not less injurious than indecision. . . ."

TRAIN YOUR MEN AS A TEAM

"More than all else, it is necessary to have soldiers who will quickly conform to discipline; and it is necessary to keep them together in these companies, to drill them in their ranks, and make them step quickly, or forwards or backwards, or go over difficult ground without breaking line; for men who can do this well are practiced soldiers, and even although they may never have set eyes on the enemy may be said to be veteran soldiers."

"For a commander cannot depend upon untrained soldiers who have learned nothing, nor can he expect them to do anything well. And if a second Hannibal were to command such troops he would nevertheless be ruined, for a general cannot be everywhere during a battle. If he have not beforehand filled his soldiers with the same spirit that animates himself and if he have not trained them promptly and precisely to obey his orders, he will inevitably be beaten."

The whole of Machiavelli's work strives for political realism and universal validity. To achieve this he has selected from history incidents supporting the conclusions he derived from his own experiences and thoughts.

In 1506 the Florentine Government empowered Machiavelli to form a national militia. He was in complete charge of activating and training this militia; and in 1508 he personally led it victoriously against the city-state of Pisa. Although Machiavelli could draw greatly upon his own experiences and those of the ancients,

his most admired and supreme example of leadership was exemplified in a contemporary—Cesare Borgia.

Borgia a Natural Leader

Cesare Borgia was the illegitimate son of Pope Alexander VI. Although a layman, Cesare was made a cardinal in 1493 at the age of 14. However, like Machiavelli, the game of politics was more to his interest and five years later at the age of 19, he was released from his cardinalate to become the generalissimo of the Papal Army.

He was one of those rare individuals who possess all the traits of a great leader. He was strong and handsome, knew no fear, had a prodigious force of character, and was extremely intelligent and alert.

In his first campaign against the Italian Romagna he led a group of mercenaries to reconquer the Papal States of Forli and Imola. He achieved a great triumph—but it was brief for his foreign troops mutinied because there were insufficient funds to pay them. Borgia then recruited and trained his own troops and led them magnificently and daringly to conquer all of central Italy. It is interesting to note that on his last campaign his engineer in chief was the many talented Leonardo da Vinci.

Quick, Decisive Action

Borgia knew what he was about. He knew his men and cared for their welfare. Always did he set the example with feats of great daring. Durant says:

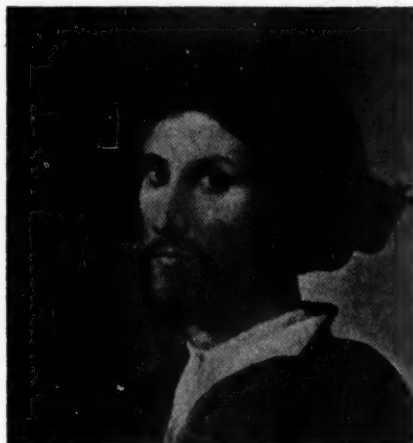
Those who knew him respected his shrewd intelligence, his capacity for going directly to the heart of the matter, for seizing every opportunity that chance presented, and for taking quick, decisive, and effective action. He was popular with his soldiers, who secretly admired the saving severity of his discipline.

Florence sent Machiavelli on a mission to Borgia's forces in the field. Machiavelli wrote to his government:

This lord is splendid and magnificent,

and is so bold that there is no enterprise so great that it does not seem to him small. To gain glory and dominions he robs himself of repose, and knows neither danger nor fatigue. He comes to a place before his intentions are understood. He makes himself well liked among his soldiers, and has chosen the best men in Italy. These things make him victorious and formidable, with the aid of perpetual good fortune.

Cesare Borgia developed a sense of responsibility in his subordinates. At the age of 28 he had conquered a vast realm and ruled as governor from Rome. He punished severely his appointees who misused their



Cesare Borgia

position. He was ruthless but just. The Romagna was given a strong and decent government. There was peace. So effective was his rule that the Papal States which he welded together lasted more than 350 years, until 1870.

It is not without reason that Machiavelli, the father of power politics and author of the first modern classic on military tactics should say of this man of action, Cesare Borgia "... to be followed and revered by the soldiers ... one can find no better example than the actions of this man."

How Hitler Saved Britain

Dunkерque and the Fall of France

Captain B. H. Liddell Hart, *British Army, Retired*

This is the last in a series of three MILITARY REVIEW articles by Captain Liddell Hart. The previous subjects have been "The Great Illusions of 1939" (January 1957) and "How Hitler Broke Through in the West" (March 1957).—Editor.

THE most amazing revelation about World War II is that the escape of the British Expeditionary Force in 1940 was due primarily to Hitler's personal intervention. After his tanks had overrun the north of France and cut off the British Army from its base, Hitler held them up just as they were about to sweep into Dunkerque—the last remaining port of escape left open to the British. At that moment the bulk of the British Expeditionary Force (BEF) still was many miles from the port. But Hitler kept his tanks halted for three days.

His action preserved the British forces when nothing else could have saved them. By making it possible for them to escape he enabled them to rally in England, continue the war, and man the coasts to defy the threat of invasion. Thereby he produced his own ultimate downfall, and Germany's, five years later.

Acutely aware of the narrowness of the escape, but ignorant of its cause, the British people spoke of "the miracle of Dunkerque." The entire watching world was astounded by our escape, even more than we were, and the phrase became universal. But the real miracle, unknown to all, was Hitler's intervention.

How did he come to give the fateful halt order, and why? It has remained a

puzzle in many respects to the German generals themselves, and since Hitler is dead it will never be possible to learn for certain how he came to his decision and what his motives were. Even if he were alive and could speak, his explanation hardly would be reliable. Men in high position who make a fatal mistake rarely tell the truth about it afterward, and Hitler was not one of the most truth-loving of great men. It is more likely that his evidence would confuse the trail. It is also quite likely that he could not have given a true explanation even if he had wished, because his motives were apt to be mixed and his impulses changeable. Moreover, all men's recollection tends to be colored by what happened later.

In the course of prolonged exploration of this critical event, however, I have acquired a good many clues, and have been able to piece together not only the chain of events but what seems a reasonably probable chain of causation leading up to the fateful decision.

First, let us pick up and follow the chain of events. In the previous article I related how, at the start of the German invasion, General Fedor von Bock's Army Group engaged the Allied left wing armies in Belgium while the massed columns of Field Marshal Karl von Rundstedt's Army Group were pouring through the wooded Ardennes toward the French frontier. I went on to tell how the decisive breakthrough across the Meuse was made at Sedan by General Heinz Guderian, leading the spearhead of Rundstedt's Army Group. Then, I recounted how Guderian was pulled up on the Oise by Hitler's sud-

den qualms of anxiety, but released again on 18 May—before the French had taken the chance of recovery with which they had been presented.

Dramatic Race to Coast

The next stage of the drive was even more dramatic. Racing west to the Channel coast, and cutting the lines of supply to the Allied left wing in Belgium, Guderian's Panzer corps reached the sea near Abbeville on the 20th. Then he wheeled north, heading for the Channel ports and the rear of the British Army—which was still in Belgium, facing the frontal advance of Bock's infantry forces. On Guderian's right in this northward drive was General Georg-Hans Reinhardt's Panzer corps, also part of General Paul von Kleist's group.

On 22 May Boulogne was isolated by Guderian's advance, and on the next day Calais. This stride brought him to Gravelines, barely 10 miles from Dunkerque. Reinhardt's tanks also arrived on the canal line Aire-St. Omer-Gravelines. But there the continuation of the drive next day was stopped by orders from above. The Panzer leaders were told to hold their forces back behind the line of the canal. They bombarded their superiors with urgent queries and protests, but were told that it was "the Führer's personal order."

When I questioned Field Marshal von Kleist immediately after the war about these events of 1940, he said that when he got the order it seemed to make no sense to him.

Was it tactical acumen, fear, politics, unwarranted faith in Göring's Luftwaffe, or a combination of all four that caused Hitler to halt his armored columns and thus save the beleaguered British at Dunkerque?

I decided to ignore it, and to push on across the canal. My armored cars actually entered Hazebrouck, and cut across the British lines of retreat. I heard later that the British Commander in Chief, Lord Gort (6th Viscount Lord John S. Gort), had been in Hazebrouck at the time. But

then came a more emphatic order that I was to withdraw behind the canal. My tanks were kept halted there for three days.

In the interval the most that was conceded was permission to conduct reconnaissance movements.

Begged for Authority

General Wilhelm von Thoma, who was chief of the tank side of the general staff, told me that he went right up forward with the leading tanks, near Bergues—only five miles from Dunkerque on the main road running inland. Here he could look into the town of Dunkerque itself. "I sent back wireless messages direct to OKH (Army High Command) begging for permission to let the tanks push on." But his appeal was fruitless. Referring to Hitler's attitude, he bitingly remarked: "You can never talk to a fool. Hitler spoilt the chance of victory."

Even as it was the evacuation of the British forces had been an extremely precarious affair—and without the help of Hitler's halt order it would have been hopeless.

Before probing deeper into the roots of that saving intervention by the enemy in chief, let us see what was happening on the British side, and follow the course of that grand-scale escape.

On the 16th the BEF had made a step back from its advanced line in front of Brussels. But before it arrived in its new

position on the Schelde, that position had been undermined by Guderian cutting the BEF's communications far to the south. On the 19th the cabinet heard that Gort was "examining a possible withdrawal toward Dunkerque if that were forced upon him." The cabinet, however, sent him or-

ders to march south into France and force his way through the German net that had been flung across his rear—although they were told that he had only four days' supplies and ammunition sufficient for one battle.

These instructions accorded with the new plan which General Maurice Gamelin, the French commander in chief, had made belatedly and issued that morning. In the evening Gamelin was sacked and replaced by General Maxime Weygand who had been summoned back from Syria. Weygand's first act was to cancel Gamelin's order while he studied the situation. After three days' further delay he produced a plan similar to his predecessor's. It proved no more than a paper plan.

Meanwhile, Gort, although arguing that the cabinet's instructions were impracticable, had tried an attack southward from Arras with two of his 12 divisions and the only tank brigade that had been sent to France. When this counterstroke was launched on 21 May it had boiled down to an advance by two tank battalions followed by two infantry battalions. The tanks made some progress but were not backed up, the infantry being shaken by dive-bombing. The neighboring French First Army was to have cooperated, with two of its 13 divisions, but its actual contribution was slight. During these days the French were repeatedly paralyzed by the moral effect of the German dive bombers and the swift maneuvering tanks.

Fine Opportunity Lost

It is remarkable, however, to find what a disturbing effect this little tank counterstroke had on some of the German higher

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commanders. For a moment it led them to think of stopping the advance of their own tank spearheads. Rundstedt himself described it to me as "a critical moment," saying: "For a short time it was feared that our armored divisions would be cut off before the infantry divisions could come up to support them." Such an effect showed what a vital difference to the issue might have been made if this British riposte had been made with two armored divisions instead of merely two tank battalions.

Foreseeing the very situation that arose I had urged from 1935 on, both in *The Times* and in official quarters, that our military effort should be concentrated on providing a stronger air force and two to three armored divisions for a counterstroke against any German breakthrough in France, instead of sending an expeditionary force composed of infantry divisions—of which the French had plenty. This principle was accepted by the cabinet at the end of 1937, but discarded early in 1939 in favor of building an expeditionary force of the familiar pattern. By May 1940, a total of 13 infantry divisions had been sent to France, without a single armored division. These divisions proved unable to do anything to save the situation.

After the flash-in-the-pan at Arras the Allied armies in the north made no further effort to break out of the trap, while the belated relief offensive from the south that Weygand planned was so feeble as to be almost farcical.

While the highest circles continued to debate impracticable plans, the armies cut off in the north were falling back on a slant closer to the coast. They were under increasing frontal pressure from Bock's infantry armies—although they were spared a deadly stab in the back from the Panzer forces.

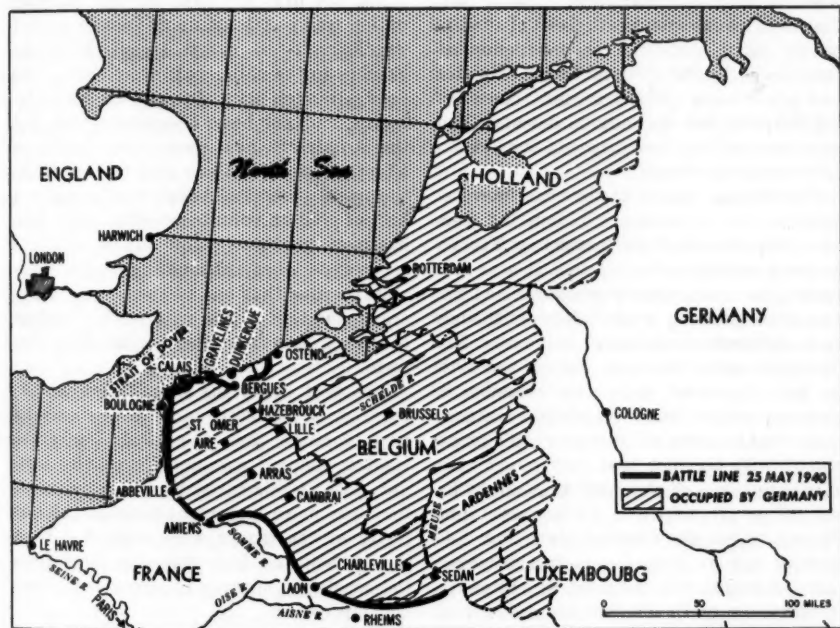
Gort Decides to Leave

On 24 May Weygand bitterly complained that:

The British Army had carried out, on its own initiative, a retreat of 25 miles toward the ports at a time when our troops moving up from the south are gaining ground toward the north, where they were to meet their allies.

In fact, the French troops from the south had made no perceptible progress—Weygand's words merely showed the state of unreality in which he was living. But

That same day the Belgian Army's line cracked in the center under Bock's attack, and no reserves were left to fill the gap. King Leopold had sent repeated warnings to Mr. Churchill, through Admiral Sir Roger John B. Keyes, that the situation was becoming desperate. Now at a stroke it had become hopeless. Most of Belgium had already been overrun and the army had its back close to the sea, penned in a



on the evening of the 25th Gort took the definite decision to retreat to the sea, at Dunkerque. Forty-eight hours earlier the German Panzer forces already had arrived on the canal line only 10 miles from the port. On the 26th the British Cabinet allowed the War Office to send Gort a telegram approving his step and "authorizing" him to carry out such a retirement! Next day a further telegram was sent to tell him to evacuate his forces by sea.

narrow strip of land that was packed with civilian refugees. So in the late afternoon the King decided to sue for an armistice—and the "cease fire" was sounded early the next morning.

The Belgians' surrender increased the danger that the BEF would be cut off before it could reach Dunkerque. Mr. Churchill had just sent King Leopold an appeal to hold on, which he privately described to Gort as "asking them to sacrifice them-

selves for us." It is understandable that the encircled Belgians, who were already aware that the BEF was preparing to evacuate, did not see that appeal in the same light as Mr. Churchill. Nor was King Leopold willing to follow Mr. Churchill's advice that he should himself "escape by airplane before too late." The King felt that he "must stay with his army and people." His decision may have been unwise in the long view, but in the circumstances of the time it was an honorable choice. Mr. Churchill's subsequent criticisms of it were hardly fair, while the violent denunciations made by the French Prime Minister and press were grossly unjust—considering the way that the Belgian downfall had been produced by the collapse of the French defense on the Meuse.

The British retreat to the coast now became a race to reembark before the German trap closed—notwithstanding French protests and bitter reproaches. It was fortunate that preparatory measures had begun in England a week before—although on a different assumption, so far as Mr. Churchill was concerned. For on the 20th he had approved steps "to assemble a large number of small vessels in readiness to proceed to ports and inlets on the French coast," with the idea that they might help in rescuing bits of the BEF that might be cut off as it tried to push south into France, under the existing plan. The Admiralty lost no time in making preparations. Admiral Sir Bertram H. Ramsay, commanding at Dover, had been placed in operational control on the previous day, the 19th.

A Desperate Situation

In the days that followed the situation rapidly became worse, and it was soon clear to the Admiralty that Dunkerque would be the only possible route of evacuation. *Dynamo* was put into operation on the afternoon of the 26th—24 hours before the Belgian appeal for an armistice, and also before the cabinet had authorized the evacuation.

At first it was not expected that more than a small fraction of the BEF could be saved. The Admiralty told Ramsay that he was to aim at bringing away 45,000 within two days and that it was probable the enemy would have made further evacuation impossible by then. Actually, only 25,000 were landed in England by the night of the 28th. It was fortunate that the period of grace proved considerably longer.

For the first five days the rate of evacuation was restricted by an insufficiency of small boats to carry troops from the beaches to the ships waiting offshore. This need, although pointed out by Ramsay originally, had not been adequately met. But the Admiralty now made more extensive efforts to provide them and to man them, the naval personnel being reinforced by a host of civilian volunteers—fishermen, lifeboatmen, yachtsmen, and others who had some experience in handling boats. Ramsay recorded that one of the best performances was that of the crew of the fire-boat *Massey Shaw* from the London Fire Brigade.

The first heavy air attack came on the evening of the 29th and "it was only by good fortune that the vital Dunkerque Harbor channel was not blocked by sinking ships at this early date." Its preservation was more important because the majority of the troops were embarked from the harbor and less than one-third from the beaches—contrary to subsequent popular impression.

Air Attacks Take Toll

In the next three days the air attacks increased, and on 2 June daylight evacuation had to be suspended. The fighters of the Royal Air Force from airfields in southern England did their utmost to keep the Luftwaffe at bay, but, being outnumbered and unable to stay long over the area because of the distance, they could not maintain anything like adequate air cover. The often repeated bombing attacks were a severe strain on the troops waiting

on the beaches, although the soft sand blanketed the effects. Far more material damage was done over the sea where the losses included six destroyers, eight personnel ships, and over 200 small craft out of a total of 860 British and Allied vessels of all sizes employed in the evacuation.

It was very lucky that the German Navy made very little attempt to interfere either with U-boats or E-boats. Happily, too, the evacuation was favored by extremely good weather.

By 30 May 126,000 troops had been evacuated, while the balance of the BEF had arrived in the Dunkerque bridgehead—except for fragments that were cut off during the retreat. The defense of the bridgehead against the enemy's encircling advance on land now became much firmer in consequence. The Germans had missed their opportunity.

Unhappily, the French higher commanders in Belgium, still conforming to Weygand's impossible plan, had hesitated to retreat to the sea and to do so as quickly as possible along with the British. As a result of that delay nearly half of what was left of the French First Army had been cut off on the 28th near Lille and was forced to surrender on the 31st. The gallant three-day stand of these troops, however, helped the escape of the remainder, as well as the British.

By midnight on 2 June the British rearguard embarked and the evacuation of the BEF was complete—224,000 men had been brought away safely, and only about 2,000 were lost in ships sunk en route to England. Approximately 95,000 Allied troops, mainly French, also had been evacuated.

On the next night every effort was made to bring away the remaining Frenchmen, despite increasing difficulties, and 26,000 more were saved. Unfortunately, a few thousand of the rearguard were left, and this left sore feelings in France.

By the morning of the 4th, when the operation was broken off, a total of 338,000 British and Allied troops had been landed

in England. It was an amazing result compared with earlier expectations, and a grand performance on the part of the navy.

Hitler—Savior of the BEF

At the same time, it is evident that the preservation of the BEF "to fight another day" would have been impossible without Hitler's action in halting Kleist's Panzer forces outside Dunkerque 12 days before, on 24 May. That was the greatest contribution of all to the continuance of Great Britain and the British Empire. How strangely apt that it should have been made on "Empire Day"!

What were his motives for that fateful order—so fortunate for Great Britain and so fatal to his own future prospect? It is time now to examine the clues and piece them together.

The first came from Kleist who told me how he met Hitler on the airfield at Cambrai just after the evacuation and ventured to remark that a great opportunity had been lost of reaching Dunkerque before the British escaped. Hitler replied: "That may be so. But I did not want to send the tanks into the Flanders marshes—and the British won't come back in this war."

To others Hitler gave a somewhat different excuse—that so many of the tanks had fallen out from mechanical breakdowns that he wanted to build up his strength and reconnoiter the position before pushing on. He also explained that he wanted to be sure of having sufficient tanks in hand for the subsequent offensive against the rest of the French Army.

These explanations did not give much satisfaction to commanders who had been compelled to stand still and watch victory slipping out of their grasp. The Panzer generals with whom I talked said that fresh tanks were arriving daily to replace wastage, and ridiculed the argument about the danger of the Panzer force being bogged.

At that moment there was only one British battalion covering the 20-mile stretch of the Aa between Gravelines and St. Omer, and for a further 60 miles inland the canal line was little better defended. Many of the bridges were not yet blown up or even prepared for demolition. Thus the German Panzer troops had no difficulty in gaining bridgeheads over the canal at a number of places on 23 May—and it was, as Gort said in his dispatch, "the only antitank obstacle on this flank." Having crossed it, there was nothing to hold them up—and stop them establishing themselves astride the BEF's lines of retreat to Dunkerque—except the halt that Hitler imposed.

Success Worried Hitler

It is clear, however, that Hitler had been in a highly strung and jumpy state ever since the breakthrough into France. The extraordinary easiness of his advance, the lack of resistance he had met, had made him uneasy. It seemed too good to be true. The effects can be followed in the diary that was kept by General Franz Halder, the chief of the general staff. On the 17th, the day after the French defense behind the Meuse had dramatically collapsed, Halder noted:

Rather unpleasant day. Führer is terribly nervous. Frightened by his own success, he is afraid to take any chance and so would rather pull the reins on us.

That was the day when Guderian suddenly was pulled up when in full stride for the sea (as related in the previous article). Next day Halder noted:

Every hour is precious. Führer sees it quite differently. Führer keeps worrying about south flank. He rages and screams that we are on the way to ruin the whole campaign.

Not until late that evening, when Halder was able to assure him that the followup infantry army was wheeling into

line along the Aisne as a flank shield, did Hitler agree to let the Panzer forces sweep on.

Two days later these forces reached the coast, cutting the communications of the Allied armies in Belgium. That brilliant success seems to have drowned Hitler's doubts temporarily. But they revived as his Panzer forces swung northward, especially after the momentary alarm caused by the British tank counterattack from Arras, slight as this was. His Panzer forces, which he regarded as so precious, were now heading toward the zone occupied by the British, whom he looked on as particularly tough opponents. At the same time, he was uneasy as to what the French in the south might be planning now that his back was turned.

Rundstedt Was Cautious

On the surface it appears to have been unlucky for Hitler that he chose to visit Rundstedt's headquarters on the morning of 24 May, a crucial moment. Rundstedt was a wary strategist, careful to take full account of unfavorable factors and avoid erring on the side of optimism. For that reason he was often a good corrective to Hitler, by providing a coolly balanced estimate—but it did not benefit German chances on this occasion. In his review of the situation he dwelt on the way the tank strength had been reduced in the long and rapid drive, and pointed out the possibility of having to meet attacks from the north and south, particularly from the latter direction.

Since Rundstedt had received orders the night before from General Heinrich von Brauchitsch, the army commander in chief, that the completion of the encirclement in the north was to be handed over to Bock, it was more natural that he should be thinking of the next phase in the south.

Moreover, Rundstedt's headquarters were still at Charleville, near Sedan, close behind the Aisne, and in the center of the German front facing south. That location

fostered a tendency to focus on what was in front and give less attention to what was happening on the extreme right flank where victory seemed to be assured. Dunkerque only came into the corner of his eye.

Hitler "agreed entirely" with Rundstedt's reservations, and went on to emphasize the paramount necessity of conserving the Panzer force for future operations.

On his return to his own headquarters in the afternoon, he sent for the commander in chief. "It was a very unpleasant interview," and ended in Hitler giving a definite halt order. Halder that evening mournfully summarized its effect in his diary:

The left wing, consisting of armored and motorized forces, which has no enemy in front of it, will thus be stopped in its tracks upon direct orders of the Führer. Finishing off the encircled enemy army is to be left to the air force!

Was Hitler's halt order inspired by Rundstedt? If Hitler had felt that it was in any degree to Rundstedt's influence, he would almost certainly have mentioned it after the British escape among the excuses he gave for his decision, for he was very apt to blame others for any mistakes. Yet in this case there is no trace of his ever having mentioned, in the course of his subsequent explanations, Rundstedt's opinion as a factor. Such negative evidence is as significant as any.

Perhaps Staff to Blame

It seems more likely that Hitler went to Rundstedt's headquarters in the hope of finding further justification for his own doubts and for the change of plan he wanted to impose on Brauchitsch and Halder. Insofar as it was prompted by anyone else, the initial influence probably came from Field Marshal Wilhelm Keitel and General Alfred Jodl, the two chief military members of his own staff.

There is particular significance in the

evidence I had from General Walter Warlimont who was in close touch with Jodl at the time. Astonished on hearing a rumor of the halt order, he went to ask Jodl about it.

Jodl confirmed that the order had been given, showing himself rather impatient about my inquiries. He himself took the same stand as Hitler, emphasizing that the personal experience that not only Hitler but also Keitel and he himself had in Flanders during the First World War proved beyond any doubt that armor could not operate in the Flanders marshes, or at any rate not without heavy losses—and such losses could not be borne in view of the already reduced strength of the Panzer corps and their tasks in the impending second stage of the offensive in France.

Warlimont adds that if the initiative for the halt order had come from Rundstedt, he and the others at OKW (Armed Forces High Command) would have heard of it; and that Jodl, who was on the defensive about the decision, "certainly would not have failed to point to Field Marshal von Rundstedt as the one who had initiated or at least supported that order"—as that would have silenced criticism, because of Rundstedt's "undisputed authority in operational matters among all senior general staff officers."

Luftwaffe Overrated

Warlimont went on to say:

One other reason, however, for the halt order was revealed to me at the time—that Göring appeared and reassured the Führer that his air force would accomplish the rest of the encirclement by closing the sea side of the pocket from the air. He certainly overrated the effectiveness of his own branch.

Warlimont's statement gains significance when related to the last sentence in Halder's diary note of the 24th, previously quoted. Moreover, Guderian stated that the order came down to him from Kleist,

with the words: "Dunkerque is to be left to the Luftwaffe. If the conquest of Calais should raise difficulties that fortress likewise is to be left to the Luftwaffe." Gunderian remarked: "I think that it was the vanity of Göring which caused that fateful decision of Hitler's."

At the same time, there is evidence that even the Luftwaffe was not used as fully or as vigorously as it could have been, and some of the air chiefs say that Hitler put the brake on again here.

All this caused the higher circles to suspect a political motive behind Hitler's military reasons. General Guenther Blumentritt, who was Rundstedt's operational planner, connected it with the surprising way that Hitler had talked when visiting their headquarters:

Hitler was in very good humor, he admitted that the course of the campaign had been 'a decided miracle,' and gave us his opinion that the war would be finished in six weeks. After that he wished to conclude a reasonable peace with France, and then the way would be free for an agreement with Britain.

He then astonished us by speaking with admiration of the British Empire, of the necessity for its existence, and of the civilization that Britain had brought into the world. He remarked, with a shrug of the shoulders, that the creation of its empire had been achieved by means that were often harsh, but 'where there is planing, there are shavings flying.' He compared the British Empire with the Catholic Church—saying they were both essential elements of stability in the world. He said that all he wanted from Britain was that she should acknowledge Germany's position on the Continent. The return of Germany's lost colonies would be desirable but not essential, and he would even offer to support Britain with troops if she should be involved in any difficulties anywhere.

He concluded by saying that his aim was

to make peace with Britain on a basis that she would regard as compatible with her honor to accept.

Political Considerations

In subsequent reflection on the course of events, Blumentritt's thoughts often reverted to this conversation. He felt that the "halt" had been called for more than military reasons, and that it was part of a political scheme to make peace easier to reach. If the British Army had been captured at Dunkerque, the British might have felt that their honor had suffered a stain which they must wipe out. By letting it escape Hitler hoped to conciliate them.

Since this account comes from generals who were highly critical of Hitler, and admit that they themselves wanted to finish off the British Army, it is of more significance. Their account of Hitler's talks at the time of Dunkerque fits in with much that he himself wrote earlier in *Mein Kampf*, and it is remarkable how closely he followed his own bible in other respects. There were elements in his makeup which suggest that he had a mixed love-hate feeling toward England.

Hitler's character was of such complexity that no simple explanation is likely to be true, and no single one adequate. It is far more probable that his decision was woven of several threads. Three are visible—Hitler's desire to conserve tank strength for the next stroke, his longstanding fear of marshy Flanders, and the effect on him of Göring's claims for the air force. But it is quite likely that some political threads were interwoven with the military ones in the mind of a man who had a bent for political strategy and so many twists in his thought.

Whatever the true explanation may be, at least we can be content with the result, for his hesitations came to Great Britain's rescue at the most critical moment of her history.

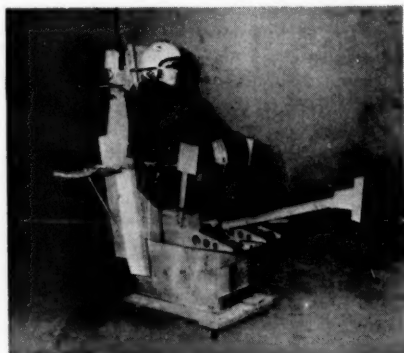
MILITARY NOTES

AROUND THE WORLD

UNITED STATES

Flying Ejection Seat

A pilot ejection seat that flies like an airplane has been developed to provide



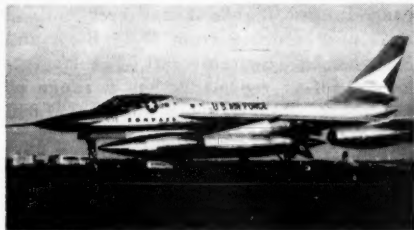
Ejection seat with wings

safe escape from combat aircraft traveling at high supersonic speeds. The seat, which is now receiving full-scale tests, is parachute equipped and has complete aerodynamic stability and windblast protection. It features vertical fins which extend along each side of its back, stubby wings, and a waffle-size steel wind deflector mounted on a four-foot-long boom in front of the occupant. Completely automatic in functioning, the pilot has only to pull a D-ring located between his feet to separate himself from his plane. After the

parachute opens at a preset altitude and airspeed, the seat separates from the pilot and falls free. Safe ejection with this device has been predicted by its designers for stratospheric heights and at twice the speed of sound.—Commercial release.

Detachable Pod

The *B-58 Hustler* (MILITARY REVIEW, Dec 1956, p 64 and Mar 1957, p 63), which is said to have broken the sound barrier at less than full power, was specifically designed to carry a detachable pod under its fuselage. This feature permits the



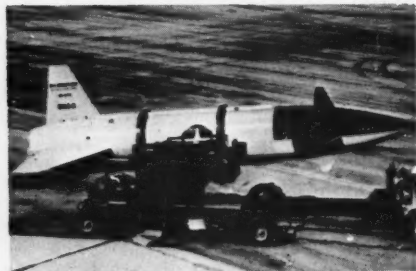
B-58 with attached pod

delta-wing plane to perform a variety of missions. In preparation for final static tests the *B-58*, minus engines and external bomb pod, was partially tucked into the bomb bay of a *B-36* intercontinental bomber for a 950-mile flight from Texas to Ohio. This method of transportation was said to be cheaper than installing the engines in

the *Hustler* airframe and flying it under its own power. The airframe will receive extensive tests because of its advanced design, and because the *Hustler* is the first plane to use metal "sandwich" panels for primary structures.—Commercial release.

Air-Launched Guided Missile

The *GAM-63 Rascal* is a long-range, rocket-powered, air-to-surface guided missile. It is designed for use in conjunction with manned bombers as an aid for penetrating enemy defenses. Combined with high-altitude, high-speed bombers, the *Rascal* can be launched miles away from the



Air-to-surface *GAM-63 Rascal*

target and can proceed to its destination while the carrier bomber is returning to base. In test flights it has been carried aloft and launched from *B-47*, *B-36*, and *B-50* bombardment aircraft. The 20-foot-long *GAM-63* reportedly has a range of 100 miles and attains a speed of 1,000 miles an hour.—News item.

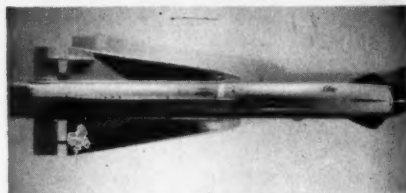
Gas Turbine Vessel

A new nomenclature, GTV, is added to the marine lists by the conversion of the 13,000-ton Liberty ship, *John Sergeant*, to a gas turbine propulsion system. In the conversion the vessel gained eight knots in speed, and the powerplant proved quite economical in operation. The 466-foot *Sergeant* is equipped with a new bow, adding 25 feet to its length, and uses a 14½-foot hydraulically operated controllable-pitch propeller. It was also announced that the 25,000-ton *Maumee*, a *T-5* tanker,

is now in service with the Military Sea Transport Service. This is the first vessel of the MSTS long-range construction program which includes *T-5* tankers, a cargo ship (dock), and ice-worthy cargo ships and small tankers. Three other *T-5* tankers under construction are the *Potomac*, *Shoshone*, and *Yukon*.—News item.

Air-to-Air Missile

The *GAR-1D* air-to-air guided missile (MILITARY REVIEW, Sep 1956, p 68) has proved so successful as a defense weapon that a multimillion dollar expansion of production has been made to meet Air Force requirements. The radar-guided supersonic missile can be launched from well beyond the reach of an enemy bomber's defense on a climbing course from an interceptor that is far below the enemy bomber, thus saving the time that the interceptor would need to gain the bomber's altitude. It is said to have an extremely high probability of kill, even against maneuvering targets. The guidance system



Air-to-air *GAR-1D Falcon*

used by the *Falcon* continuously recomputes the target's direction and speed, and steers a collision course to the predicted point of impact. Although exact performance figures have not been announced, according to *Jane's All the World's Aircraft*, 1956-57, the *GAR-1D* has a range of six miles and a speed of 1,980 miles an hour.—Commercial release.

Aircraft for Reserve Divisions

The issue of up to three *L-19* reconnaissance and observation aircraft to Army Reserve combat divisions has been approved for Fiscal Year 1958. It is anti-

pated that *L-19's* will be made available to each division that has the capability of receiving, operating, and maintaining the aircraft. There are 10 Army Reserve combat divisions.—Official release.

'Lacrosse' in Production

The *Lacrosse*, a highly accurate field artillery guided missile now in production, is designed for close support operation in the field. The essential elements of the



Lacrosse on vehicular mount

surface-to-surface system are the missile, a truck-mounted launcher, and a guidance station. It is said to be able to answer calls for fire in the same time as required for conventional artillery.—Official release.

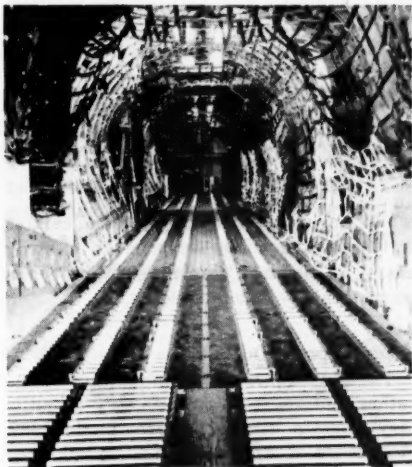
Atomic Support Units

Two United States Army Missile Command units, one air transportable and the other a larger "medium" unit, are scheduled for early organization. The air-transportable command will have one battalion of *Honest John* rockets capable of firing either conventional or atomic warheads. It will have its own logistical support units, and a small reconnaissance aircraft section. The medium atomic support command will have one battalion equipped with *Corporal* guided missiles and a maximum of four *Honest John* battalions. This unit also will have necessary organic logistical support, and will have a sky cavalry battalion which uses both fixed-wing

aircraft and helicopters to perform air and ground reconnaissance missions. Several more atomic support units are planned for future activation.—News item.

Cargo Loading System

A new concept of loading and unloading the *C-133A* transport aircraft (MILITARY REVIEW, Apr 1956, p 67) utilizes roller conveyors on the floor of the plane's 90-foot-long cargo hold and on a loading dock of matching height. The conveyors can be installed into fittings already in the aircraft in about five minutes. The cargo is moved into the huge compartment by winch power; tie-down is accomplished



Conveyor system of the *C-133A*

by special nets which are dropped over the cargo after it is in place. In a trial test of this system a mixed cargo was loaded on the giant transport in a fraction of the time taken by conventional methods. The *C-133A* can haul a 50,000-pound payload 3,500 nautical miles, or a 50-ton load for 1,200 miles. Its carrying capacity is about twice that of the *C-124*, the largest production transport in the military service.—Commercial release.

Hunter-Killer Helicopter

The Navy *HSL-1* helicopter now can seek out and destroy submarines. Its equipment includes an underwater sonic detection device which it lowers into the water



Underwater probing technique

while hovering. The *HSL-1* also carries lightweight homing weapons to destroy enemy submarines pinpointed by its sonar instruments.—Official release.

Armed Forces Day

The 10th anniversary of military unification and the 15th anniversary of military aviation will be keynoted in the 1957 observance of Armed Forces Day. "Power for Peace" will be the slogan for public exhibits scheduled in some 3,000 communities. Approximately 500 parades with more than half a million servicemen participating are planned throughout the continental United States and in the five major overseas commands.

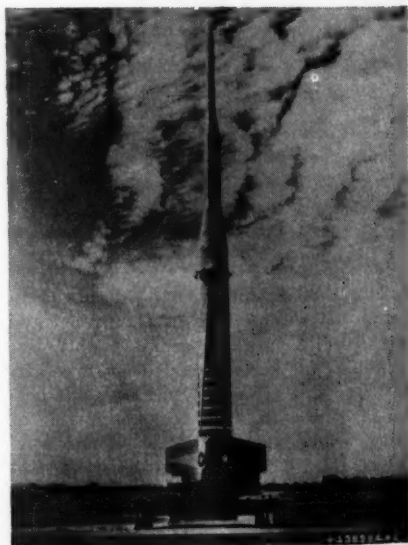
On Armed Forces Day, 1956, more than three million people attended 1,200 community programs, and about six and one-half million persons observed parades and reviews in which some 600,000 uniformed personnel participated.—News item.

Management Association

The Armed Forces Management Association, a national nonprofit organization devoted to the improvement of management throughout the Department of Defense, comprises 27 chapters with military and civilian membership representing all ranks and grades. The official organ of the AFMA is the *Armed Forces Management* quarterly. Among the programs sponsored by the AFMA is the Incentive Awards Program, under which 62,000 separate suggestions benefited the Army by over 20 million dollars in 1955. Further information can be obtained from the Membership Committee, AFMA, 1635 North Woodstock Street, Arlington 7, Virginia.

Three-Stage Test Rocket

The three-stage *X-17* test rocket is used to provide information on the problems



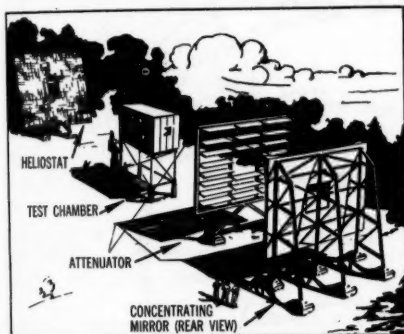
X-17 three-stage rocket

which arise when the warhead of a ballistic missile reenters the earth's atmosphere at high speed. The speed attained by the

six-ton missile and the height to which it rises have not been announced.—Official release.

Giant Solar Furnace

A solar furnace capable of concentrating the sun's rays to produce temperatures comparable to those generated by an



Artist's conception of solar furnace

atomic explosion is planned for construction, and will be used in laboratory testing of materials designed for the protection of personnel against thermal effects of nuclear weapons. The 125-foot-long device consists of a flat mirror which reflects the sun rays to a concentrating mirror at the other end of the assembly. The concentrating mirror array with 180 curved surfaces focuses the rays through a control "attenuator" into a four-inch beam within the test chamber. The furnace will have the energy equivalent of approximately 28 kilowatts.—Official release.

Ballistic Missiles Contracts

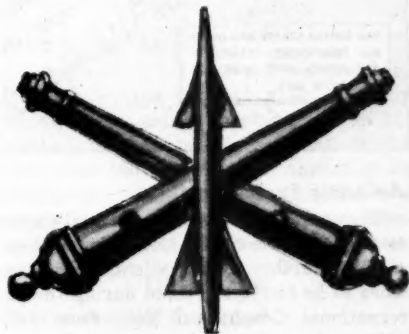
Three contracts aggregating over 500 million dollars have been awarded for the design, fabrication, and test of the *Titan* and *Atlas* 5,000-mile range, intercontinental ballistic missiles which are reported to have met "major milestones on schedule," and the 1,500 mile *Thor* which has entered its flight test stage.—News item.

'Nautilus' Refuels

In traveling over 60,000 miles, of which 34,500 were submerged, during 225 days at sea, the *Nautilus* (the world's first atomic-powered submarine) is reported to have consumed a little over eight pounds of uranium. The *Nautilus* is receiving a new type generator which is expected to extend greatly its fuel performance. A total of 15 nuclear-powered submarines are planned for construction (MILITARY REVIEW, Aug 1957, p 68). Fourteen of these vessels are either built, or under construction. The latest to be announced is the *SSN 591* which will be an attack submarine with an *Albacore* type hull and a single screw, and will cost 24 million dollars. The nuclear plant of the *SSN 591* will use pressurized water as a coolant.—News item.

Insigne Changed

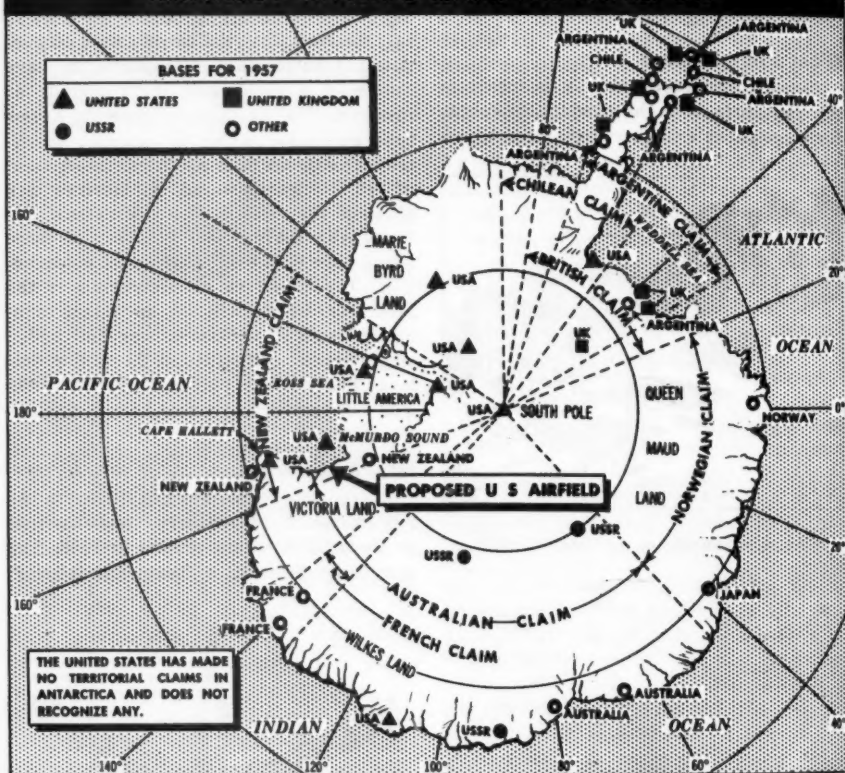
A new insignie, designed to symbolize the modernization of artillery weapons, will be worn by Artillery officers in 1958. The new badge features a "composite missile"



Modernized Artillery insignie

added to the crossed cannons which have been in use for the past 50 years. Guidons and standards bearing the old emblem will be used until worn out.—Official release.

ANTARCTICA—NATIONAL CLAIMS AND AIRFIELD SITE

**Antarctic Exploration**

The confusing picture of national claims to various sections of Antarctica is complicated further by the scientific observations to be conducted there during the International Geophysical Year from July 1957 to the end of 1958 (MILITARY REVIEW, Jan 1957, pp 69 and 72). Argentina, Australia, Great Britain, and Chile have established permanent Antarctic stations; New Zealand has a station at Cape Hallett; and France has maintained bases in Adélie Land for the past seven years.

Information as to the permanence of the

Soviet main base at Mirnyy, in the Australian-claimed sector, is not available. The USSR recognizes no nation's claims in the Antarctic and has stated she would recognize no agreement as to territorial rights in the Antarctic in which the Soviet Union was not a participant (MILITARY REVIEW, Apr 1957, p 83). Although Marie Byrd Land was claimed for the United States by explorers Byrd and Ellsworth, the position in Washington has been that until the area is occupied, no proclamation of a claim would have any standing. (Extracted from *The New York Times*.)

CANADA

'CF-100' in Service

Two CF-100 Mk. 5 squadrons have been transferred to the Canadian NATO forces in Europe, and two more are scheduled for service with NATO in the future. The CF-100 Mk. 5 is also in round-the-clock service with the all-weather squadrons of Canada's Air Defense Command.—News item.

Army Structure Revamped

In a move toward increasing the capability of the Canadian Army for atomic war, two of the four battalions of the elite Canadian Guards regiment will be disbanded and a third armored regiment will be added to the two now in being. An armored regiment consists of 62 *Centurion* tanks and about 800 men. The changes leave the Canadian Army with 13 battalions of infantry and three armored regiments. Three of the infantry battalions, plus an artillery regiment, are organized into a brigade and are serving in NATO forces in Germany. The remaining battalions are incorporated into the Canadian 1st Division and form the mobile striking force. Plans for reorganization of the Canadian infantry division have not been completed, but it is expected that the traditional structure of three 5,000-man brigades with organic artillery and armor will be broken up into less unwieldy units.—News item.

SYRIA

Soviet Arms Promised

A Syrian mission in Moscow has been promised enough Soviet weapons to equip seven infantry and three armored divisions, help for their naval forces, and equipment for eight to 10 MiG jet squadrons according to a report. It has been indicated also that imports into the Syrian main port of Latakia have tripled during the past year. Many of these imports have been Soviet arms.—News item.

USSR

Industrial Expansion

Large deposits of coal and rare metals have been discovered in the Amur River basin on the eastern Soviet-Manchuria border according to a report. A major industrial and agricultural center is planned for that area. Several hydroelectric power stations on the Amur are included in the plans for industrial buildup. New industries likewise are planned for the Yenisei River area, and some factories there are already in the blueprint stage. It also is reported that oil prospecting in Turkmen, east of the Caspian Sea, has found a vast oil-bearing belt which is believed to extend through the Kara-Kum Desert to the east.—News item.

Jet Airliner

A turbojet airliner which will cruise at a speed of 370 miles an hour, and carry from 60 to 80 passengers is reported to be under construction. The four-jet aircraft, called the *Ukraina*, is said to use less fuel than the British *Vickers Viscount*.—News item.

Atomic Pact Ratified

The Soviet Union has ratified the charter of the international atomic agency which was unanimously adopted at an 82-nation conference last year (*MILITARY REVIEW*, Jan 1957, p 66). The agency is an outgrowth of President Eisenhower's atoms-for-peace proposals and is expected to begin operation this year.—News item.

DENMARK

Submarine Net Salvaged

The 25-mile-long steel submarine net that the Germans set up in World War II between Jutland and the island of Zealand is being salvaged by Danish experts. The net was taken up and sunk in the deep bay of Aarhus at the end of the war. It will be melted down by a West German firm at Kiel.—Official release.

WEST GERMANY

Naval Force Plans

The projected strength of the West German Navy has been set at 170 ships and 20,000 men. The naval construction planned includes eight destroyers of about 2,200 tons each, the first of which will be completed in 1960.—News item.

Helicopters Ordered

The West German Government has contracted for the purchase of 26 *H-21* helicopters (MILITARY REVIEW, Mar 1955, p 64), five of which will be used for Luftwaffe and army training. The rest will be for the West German Army Aviation Organization.—News item.

GREAT BRITAIN

Advanced Turbojet

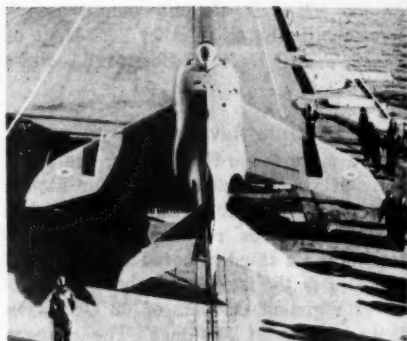
The *Orpheus B.Or.3* turbojet engine propels the *Folland Gnat* jet fighters of Great Britain, India, and Finland; Italy's *Fiat G-91*; France's *Dassault Etendard VI*, and is planned for use in France's *Breguet 1001 Taon* light fighter; Spain's *Hispano HA-300*; and Japan's *TIF-1* trainer. The 4,850-pound thrust *Orpheus* was developed under the Mutual Weapons Development Program agreement between the United States and the United Kingdom.—Commercial release.

Plastic Drop Tanks

British-made plastic drop tanks are in use by the German Navy's *Sea Hawk* fighter, and the *Hawker-Hunter* aircraft of the air forces of Sweden, Peru, Switzerland, and Denmark. The plastic drop tanks, which are said to have better aerodynamic qualities than metal tanks, are designed to a standard range varying from 50 to 500 gallons. They are made in three parts, and alternative capacities can be obtained by varying the length of the center section which is cylindrical. The tanks are made of an asbestos-reinforced, phenoplastic material.—Commercial release.

'N. 113' in Production

The *Vickers Supermarine N. 113* naval interceptor and strike aircraft is now in production for the Royal Navy. Production models of the twin-jet, single-seat supersonic *N. 113* are armed with four 30-mm



Supermarine on catapult

Aden cannon. It utilizes a "blown flap" system wherein air from the engine compressor is blown over the upper surfaces of the wing flaps to increase lift by local acceleration of the airflow. This permits a much slower approach for carrier landing.—News item.

Atomic Power Plan

Great Britain's revised atomic power plan contemplates the construction of 16 more nuclear stations for the production of electricity by 1965 at an estimated cost of over four billion dollars. The planned stations will produce 5,000 to 6,000 megawatts (one megawatt equals one million watts), about one-fourth of the electricity the nation needs. A year's operation of all atomic generating stations now in the planning stage is expected to save the nation about 18 million tons of coal. Three nuclear stations were ordered when the atomic energy plan was set up in 1955. One of these is already supplying electricity to Great Britain's nationwide electrical distribution system (MILITARY REVIEW, Nov 1956, p 79).—News item.

Missile Regiment Announced

Great Britain is organizing her first guided missile regiment from men and officers trained by the United States Army. The regiment will comprise about 500 men, including 30 officers, organized into two batteries and a maintenance unit, and will be patterned after United States missile battalions rather than British artillery regiments. The new unit has been designated the Forty-Seventh Guided Weapons Regiment (field) Royal Artillery, and will use a training range on the Hebrides Islands, off Scotland.—News item.

POLAND

Currency Devaluated

The Polish national unit of currency, the zloty, has been devaluated from four to 24 to a dollar. The zloty has been artificially pegged to the Soviet ruble at a one-to-one ratio. The currency of all Communist nations, except Communist China, is linked to the ruble. Artificial overvaluation of these currencies has been made possible by a ban on their export or import, and they have not been used in trade between Communist and non-Communist nations. The Soviet Union is faced with the decision of maintaining the one-to-one ratio of the zloty and the ruble, thereby tacitly admitting the overvaluation of the ruble which actually has less than a 10-cent purchasing power in terms of the United States prices of comparable goods, or of accepting the new evaluation of six to one, in which case the ruble would be overvaluated grossly in terms of the zloty.—News item.

SWEDEN

All-Jet Air Force

The Royal Swedish Air Force is receiving the *Saab A 32 Lansen* which will replace the twin-engine *B 18B's*, the *A 29* (the attack version of the *J 29* swept-wing jet day fighter), and the *A 28 Vampires* in all four of Sweden's air force at-

tack wings. The *Lansen*, which has a top speed of 700 miles an hour and a service ceiling of 50,000 feet, is equipped with a Swedish-built axial flow *Avon RA.7* turbojet. Exact thrust figures for the Swedish version of this engine are not available, but in Great Britain it is rated at 9,500 pounds static thrust with afterburner and 7,550 pounds without. The all-weather and night fighter version of the *Lansen* is designated the *J 32B*.

The major part of the Swedish Air Force consists of fighter units; it has no strategic bombers. Its effective units this year are: 10 fighter wings (30 squadrons) equipped with the *Saab J 29* and *Hawker-Hunters*; one night fighter wing (three squadrons) equipped with the *Venom J 33*; four attack wings (12 squadrons) equipped



J 32B all-weather and night fighter

with the *A 32 Lansen*; five reconnaissance squadrons equipped with the piston-engined *S 18* a version of the *Saab B 18B* equipped with radar for night and all-weather flying, and the *S 29C* a reconnaissance model of the *J 29* jet fighter; one airbase corps; and one search and air rescue unit equipped with the *Catalina TP 47*, a United States built aircraft.

Personnel in the air force consists of 1,200 regular officers and warrant officers, 4,000 Short Service pilots (noncommissioned officers on flying status for a limited period), technicians and other regular service personnel, and 6,000 civilian employees.—Official release.

FRANCE

Adjustable Landing Gear

A unique feature of the projected *Nord 2506* will be a landing gear of adjustable height to facilitate the loading of vehicles and heavy freight. The *2506* transport will be propelled by wingtip-mounted *Turbomeca Marbore* turbojets, and will utilize slotted wing flaps.—News item.

Dual Powerplant Plane

The principal means of propulsion of the *SO 9050 Trident II* (MILITARY REVIEW, Feb 1957, p 71) is a *SEPR 631* rocket assembly. This rocket burns a self-igniting



Trident II with air-to-air missile

mixture of furaline and nitric acid, and each of its two combustion chambers provides a thrust of 3,300 pounds. The wingtip-mounted *Gazibo* turbojet engines of the *Trident* develop over 3,000 pounds of thrust each with afterburners, and 2,400 pounds without. The wings of the rocket plane, which are of constant cross section throughout their length, have full-span, high-lift flaps that enable the plane to take off or land in less than 800 yards with a landing speed of less than 115 miles an hour. Maximum speed of the *Trident* has not been released, but it can attain an altitude of nine miles in 2½ minutes from a standing start. Its calculated speed in level flight exceeds Mach 2. The mission of the *SO 9050* will be interception of supersonic bombers flying at very high altitudes; its armament consists of an air-to-air rocket suspended beneath the fuselage.—Commercial release.

SPAIN

Air-Naval Base

The 120-million dollar air and naval base under construction by the United States at Rota, already about one-fourth completed, will be able to berth 11 capital ships at one time, including two of the 60,000-ton *Forrestal* type aircraft carriers. It will be able to furnish the men, planes, fuel, and ammunition they may need for combat missions. An 8,000-foot airstrip will be capable of handling the largest atomic bombers, and the jet fuel system which stretches by pipeline throughout Spain will be able to store more than 120,000 barrels of oil (MILITARY REVIEW, Mar 1957, p 68). The base presently can land, refuel, and dispatch combat aircraft in an emergency. It is anticipated that the entire 6,000-acre installation will be completed in about three years.—News item.

ALBANIA

Soviet Bases Expanded

Two squadrons of Soviet jet planes are stationed on the airbase at the Albanian port of Valona (MILITARY REVIEW, Jan 1957, p 68), and several Soviet submarines have been transferred to the naval and submarine base on the nearby island of Saseno. Airstrips for Soviet jets also are being built on Cape Linguetta, and the ports of Valona and Durazzo are being enlarged to accommodate ocean-going vessels and oil tankers. The Soviets have built a pipeline from Valona to the open sea to facilitate the refueling of their vessels in the Adriatic.—News item.

IRAN

Border Agreement

The Iranian-Soviet frontier has been adjusted in what is reported to be "a friendly spirit." A joint commission which began work in 1954 has mapped the 1,250-mile stretch of the joint border of the two countries from Turkey to Afghanistan and marked it with frontier posts.—News item.

FOREIGN MILITARY DIGESTS

The Role of Ground Forces in the Atomic Age

Reprinted from an article by General H. I. Hodes, USA, in "Revue Militaire Générale" (France) February 1957.

THE mission of ground forces in the atomic age, as it always has been, is to defeat enemy forces on the land and gain control of the land and its people.

Man is a land creature. Although he has learned to accommodate himself for brief periods of time to the sea or to the air, these are but voyages away from his natural habitat—the land—and to this land he must eventually return.

He draws from the land his sustenance and the raw materials with which he fabricates the necessities and luxuries of his way of life.

Man's weapons, whether they fly through the sky or sail the sea, are built on and from the land and require bases on the land to sustain their operations.

The air and the sea are important to man as highways from one land area to another, but they are highways only by which man can project his influence and power to other land areas. They do not, within themselves, possess the inherent qualities which enable the development and maintenance of a power base for indefinite periods of time.

That is why land areas are important to man and that is why the history of man has been and always will be one of struggle for the strategic land areas of our globe.

Man will continue to challenge man over control of land areas simply because land is the source of all power and power is the source of all conflict.

Nations have chosen to separate these weapons systems for purposes of control into three somewhat arbitrary groupings—the weapons of naval warfare under navy command and control, the weapons of air warfare under air force command and control, and some (but not all) of the weapons of land warfare under army command and control.

The notion has grown that national military power is separable into naval power, landpower, and airpower—each an entity into itself and each with the capability for effecting independent and decisive action.

National military power is inseparable. A nation which can most effectively apply its weapons systems in combinations, exploiting the maximum capability of each,

with forces designed to assure accomplishment of the military objective is the nation which will gain ultimate victory.

National military power embraces the total resources of a nation for waging war. Military power when coupled with economic and political power are those forces available to a nation in the pursuit of its national objectives.

Objectives are stressed because unless military power is designed to further national objectives, its usefulness to the state is limited, and its cost to the citizenry is a deplorable burden.

The leadership of any nation must carefully relate the structure of its weapons systems to the courses which the nation has set for its future, including the commitments it has made to its friends and the dangers it faces from its enemies.

Weapons systems in our modern world are many and varied. Each system possesses its own special characteristics and capabilities and each system poses very definite limitations.

Their power ranges from the small bullet which can cause one man to change his chosen course of action, to weapons of megaton equivalence in explosive power and which cause devastation of enormous magnitude in the area of detonation. Their effective ranges vary from yards to thousands of miles and the complexity of their employment from the simplicity of a hand grenade to technological processes so involved that only highly skilled technicians can make them effective.

We have and must continue to have a wide variety of weapons systems because a wide variety of conditions exist which may limit and control the employment of any one system.

Among these conditions are the capabilities of the weapons of the enemy and the effects of weather, terrain, and relative combat strength of our own forces. In the larger sense, however, the employment of weapons systems is controlled by the nature of the military objective.

The age-old hope that the tough business of land fighting might be eliminated was given new promise by the development of these new and more powerful super-weapons.

However, when the possibilities of new weapons were weighed by responsible military and civilian leaders, it became clear that we should not rely on any one weapons system or any single service.

There is no easy way to win wars, no superweapon to guarantee victory. From the time of the bow and arrow ultimate weapons appeared with regularity. The crossbow was to be the last word, but it gave way to the longbow; the longbow to gunpowder and now we witness the overshadowing of gunpowder by atomic power.

One of the great problems which faces the ground forces today is to assess the impact of atomic-bearing missiles and projectiles on the nature of the land battle, and then to effect a proper adjustment of organization, techniques, equipment, and weapons. At the same time, there is a constant need for evaluation of the requirement for so-called conventional weapons. The Army must be prepared to use either atomic or conventional weapons as the situation requires, or as proper authority determines.

Today, the free world is faced with the prospect of many forms of conflict. Their range includes: all-out global nuclear war; a large war but one in which limitations may exist on objectives and the means authorized by political leadership to achieve them; small or peripheral wars confined to areas or means by limited objectives; and guerrilla type wars against irregular forces whose base is difficult to isolate and whose forces are difficult to engage in decisive action.

Let us consider the role of ground forces first in the all-out global war—the nuclear holocaust.

In this form of war ground forces will be essential to final victory. Final defeat of the enemy will come only when his

ground forces are defeated or have lost their desire to continue the conflict.

All types of ground operations on the thermonuclear and atomic battlefield will be difficult—even survival may be difficult. But we must learn how to overcome these difficulties—how to defeat the enemy despite obstacles. We cannot be satisfied with past experience. Briefly stated, the problem is one of gearing our maneuverability to the increased firepower available.

Warfare, both defensive and offensive, has always been a combination of firepower and maneuver; sometimes maneuver geared to firepower, at other times firepower geared to maneuver. Now, with the tremendous firepower capabilities of thermonuclear and atomic weapons, we must be capable, if we are to gain maximum exploitation, of accelerating movement or maneuver.

This means that we do not discard any of our so-called principles of warfare. But we do change our method of application.

As one example, let us consider the principle of mass. We still need mass on any battlefield, including the atomic battlefield. We can now mass our firepower more easily. We practically have it in one round, or at most several rounds, for any one locality.

It follows then that we must be capable of massing our other forces. We must have mobility, dispersion, and control—the ability to disperse and hide, coupled with the ability to converge and fight, and this must take place quickly.

In order to accomplish this we need: first, mobile and effective communications; and second, either rapid cross-country mobility or mobility through the air; or preferably both. Third, each battle group—the group which always under all conditions fights as a cohesive unit—must be capable of relatively prolonged independent action. This means it must have positive communications, adequate firepower of several types, including atomic firepower, and the means to make it mobile. Furthermore,

it must be strong enough to give it reasonable staying power by itself—strong enough to preclude early defeat by conventional means.

Modern armies, with their elaborate equipment and logistic supporting echelons in the rear, are difficult to conceal. You will remember that during the Korean conflict the Chinese employed forces totaling more than a million men, utilizing methods of combat necessitated by the fact that United Nations Forces enjoyed complete air superiority over the local battle area. They succeeded in engaging with reasonable success a fairly modern army and at the same time presenting a minimum of profitable air targets.

We do not intend to go primitive in order to decrease susceptibility to detection, but we must control our tendency to present lucrative atomic targets. This problem must receive unremitting attention.

Thus far we have dealt with the easier problem of organization and equipment. The most difficult problem is target acquisition of a nature that the most profitable targets may be assured. This is one of the most complex of the major problems confronting the Army. However, through accelerated research and scientific development, we foresee the possibility of obtaining effective locating devices which will vastly extend the present observation capabilities.

It is also essential that we have reconnaissance aircraft which will operate as desired by the ground commander concerned. He must be assured of this reconnaissance at times and places of his own choosing.

One positive means of target acquisition is effected when a salient is created either at or between obstacles or along our defensive front. So we do have, to some extent, means of acquiring both longer range and close-in targets for atomic weapons, but we need much more development in this field to get the maximum results from

our tremendously increased firepower and range.

So much for ground action in the "Big War" where destruction may cover large areas on either or both sides. Of course, our most fervent hope is that this type of war will never come. But we must conclude that it might come. The threat of atomic weapons will hang over every engagement. Therefore, we must be prepared to use atomic weapons if the situation requires.

The requirement to be capable of fighting more limited wars also continues to exist. This is borne out by what is happening several places in the world today.

This brings us then to a set of conditions with which the ground forces must be prepared to cope—a war with limitations on the objectives that are sought and consequently on the means available to the military in the pursuit of these objectives.

It is conceivable that restrictions may be established on the use of atomic weapons because minimum destruction is desired in accomplishing military ends. Such a conflict may take on a variety of forms ranging from a very sizable involvement on the part of several nations to small localized engagements. Atomic weapons may be used against carefully considered targets or they may not be employed at all. Hence it is indispensable that the ground forces have the capability and flexibility needed for dealing with a conflict where atomic weapons may or may not be used.

A premium continues to be placed on mobility, dispersion, and control so that what has been done along these lines for all-out atomic war will help for any type of war.

Concerning the guerrilla type conflict, the role of ground forces is obvious. This form of warfare is essentially a ground job, with welcome air assistance when it can be utilized to advantage but with the major burden being carried by the rifleman, the machinegunner, and the mortarman.

The paramount purpose of our present defense team is to deter aggression—to prevent war—but we know that in order to be an effective instrument of deterrence, it must be prepared to fight and to win under any circumstances. In relying on deterrence we must bear in mind that advances in technology and preparedness by a potential enemy may render today's deterrents inadequate tomorrow.

If it should come to actual fighting—if our best efforts to prevent the outbreak of a major war should prove futile—the major combat burden would sooner or later fall, as it always has, upon our ground troops. No technological advance has diminished the importance of the man on the ground. Weapons, equipment, organization, and tactics have all been revolutionized many times, but the fundamental role of the Army has not changed. It is the component of the defense team which has the means and capability needed not only to gain but also to maintain control over an enemy's land, his resources, and his people—in other words, not merely to wreak destruction upon him but actually to conquer him, which is the ultimate wartime goal of all military action.

In the event of war—no matter what kind of a war it might be, no matter what might develop in its initial stages—our Army must be ready to play its full part as a dominant force. It must be prepared to fight successfully against any aggressor, any time, any place, and on any terms.

It must be capable of fighting an all-out war. It must also be capable of coping with a remote brush fire war, an attempted seizure of power through military pressure, or any other device of military aggression.

It must be equally as ready to fight a war in which atomic weapons are used, or are not used. In short, it must never allow itself to become irrevocably committed to any one concept of war, to any particular family or type of weapons, or to any inflexible tactical doctrine.

The Delaying Maneuver

Extracted, translated, and digested by the MILITARY REVIEW from an article by Major General E. Wanty in "L'Armée-La Nation" (Belgium) November 1956.

Previous articles by this author on the general subject of atomic repercussions on established ideas were: "In Search of a More Suitable Organization" (MILITARY REVIEW, Oct 1956, p 75), and "The Evolution of Defensive Tactics" (MILITARY REVIEW, Nov 1956, p 87).—Editor.

IN WRITING several articles on this same subject there is both a hope and a conviction. The hope is of seeing numerous officers of all armies interest themselves in this terribly significant problem, and that they will dissect and criticize the ideas and suggestions advanced, for only real intellectual activity can enable us to see these matters more clearly and find urgently needed solutions for them.

The conviction is that we are traveling over shifting ground; that we are treating a matter whose basic elements are modified with surprising rapidity; and that in a very short time it very probably will be necessary to revise our own ideas.

The organization sketched in an earlier article, like so many formulas advocated by military researchers, possesses a transitory character. It retains conventional armaments. It deals with the general structure of large units, units that are lighter, afford a more economical employment of manpower, and provide greater flexibility in maneuvers and a greater adaptability to atomic war. But they have nothing of a revolutionary nature—except possibly that settled minds, asleep in comfortable conformism, consider anything revolutionary that disturbs their habits.

Since the formula suggested has stemmed from a line of argument oriented toward defensive tactics alone, it cannot be considered fully valid unless it also conforms

to the requirements of the other two great modes of traditional tactical employment: the delaying maneuver and the offensive. In addition to this it must demonstrate its capacity to wage a comparatively new form of warfare: that is, "counterguerrilla."

— And that is not all. It is quite necessary that one be able to change over from this temporary organization to a properly atomic organization with a minimum of disruption.

The Delaying Maneuver

The object of the delaying maneuver is to cause the aggressor to lose *time*, that time which the Western Alliance will always greatly need in a war conducted by classical means, for it is certain that the assailant will have the advantage of surprise. But another objective seems presently to merit equal attention: attrition of the enemy's forces without dangerously jeopardizing the reduced forces the defenders will possess initially.

The general technique of the delaying maneuver may be summed up in a few lines: utilization of the favorable properties of a region of the greatest possible depth (from this can be seen the importance of the careful determination of the first line of defense); posting on this first line forces calculated with economy and very considerably inferior to those which the aggressor will engage. Limited duration resistance must be offered on certain other lines and in other positions selected and occupied with complete freedom of action. In addition to this we must realize the maximum capability of our fire, while we avoid allowing ourselves to be pinned down by enemy action. The sum total of these successive halts, and of the rather

short periods of withdrawal which separate them, should represent a notable gain of time together with a certain attrition of the adversary.

This maneuver may seek either to weaken the enemy's thrust by inflicting on him considerable losses in a very short time, or slow the tempo of his movement by opposing obstacles to it. It may create disorder in the advance of his various columns by provoking displacements between them, or cause the failure of a planned maneuver by an unexpected modification of our own disposition. It must be the dynamic, mobile form of defense as opposed to the static and passive form.

In the framework of a war conducted in accordance with conventional methods, the main aspects of this theory still seem to be valid. Whether or not one is convinced and enthusiastic, this form of tactics undoubtedly will be imposed on the numerically weaker West.

Let us assume a defensive position of very extended front (this would quite certainly be the case) and a limited and *insufficient* number of divisions (this is the sad reality). In attempting to be strong everywhere, one has every chance of being weak at the point or points of attack chosen by the enemy. If, however, the command renounces the habitual error of uniform deployment, and accepts the risk of "shading" the distribution of its forces by posting them on the basis of the relative importances of the various sectors, we arrive at "halting defensive zones" and "delaying maneuver zones" in an over-all strategic program. It is quite likely that, on the hypothesis of a breakthrough at some point of the front, the command will resort to delaying action in order to gain the time for movement of reserves or for staging a countermaneuver.

Several factors govern the choice of the ideal terrain. The presence of all of them is more than improbable, and their reciprocal importance variable. We should, at

the present moment, be tempted to classify them as follows:

1. The existence of numerous small topographic forms favoring a large dispersion with concealment or camouflage for all the elements of the disposition.
2. Routes and passages to the rear of the position favoring withdrawal in dispersed order.
3. Obstacles to which flanks can be securely anchored.
4. Good fields of fire for all available supporting weapons.
5. Natural antitank obstacles.
6. Observation deep into the approach terrain.

There is no intention of minimizing the value of antitank characteristics of the terrain; the value of such is quite considerable. Unfortunately, this type of terrain is the most difficult to find. It is, moreover, almost to be excluded as a possibility because of the small amount of time available for the creation of artificial obstacles. As for observation points which, up to fairly recently, we would have given first place in our classification, it is no longer a question of being able to view the terrain up to distances of only one to two miles, but up to distances of six to eight miles—and this will be impossible of realization in the majority of cases.

The basic element of the delaying detachment continues to be the infantry. Let us recall the general form of the battalion such as we advocated it: a squad of one noncommissioned officer and six soldiers all armed with automatic rifles; the platoon of three squads plus two men armed with antitank weapons, or 25 men; the company of four platoons plus a weapons platoon, or 138 men; the battalion of four companies of riflemen and one heavy weapons company—a total of 800 men, 50 percent of them riflemen.

In its structure, if not in its strength, this type of battalion seems to fulfill the requirements for this particular type of

mission. It is able, *a priori*, to establish two successive lines of equal worth. It is well-known that this echelonment in depth is the basic condition of the delaying maneuver; one echelon falling back, its mission accomplished, under the cover of a second echelon which is already posted.

On the other hand, even without taking the atomic danger into account, the deployment must be more diluted and more dispersed based on the semiautonomy of strong points. Under our hypothesis, in order to cover fronts which are broader both by definition and necessity, these strong points often will be reduced to a platoon or even to a squad in especially strong parts of the terrain. It must be remembered that the principal aim is to deceive the adversary with regard to the strength and occupation of the position.

The modern, motorized battalion would be well-suited for this combat. We advocate one low, *all-terrain* vehicle per squad carrying provisions and ammunition for two or three days.

All those who have studied the tactics of the atomic era in its present phase have concluded without hesitation and without the possibility of argument that it demands great *dispersion* and, at the same time, a great deal of *mobility* to permit rapid and fleeting concentrations.

The delaying maneuver has long postulated dispersion and mobility. Can it be deduced from this that any unit, whatever it may be, that answers to the general tactical requirements of the hour is suited, *ipso facto*, for the delaying maneuver?

We must examine the capabilities of the two adversaries more closely.

The Assailant

The delaying maneuver seeks to deceive the adversary with regard to the real worth of the disposition; to cause him to act cautiously; to hesitate; and to lose time. Reconnaissance aviation, however, will enable the adversary to read, as from an open book, a carelessly emplaced dis-

position. It can even pierce camouflages.

The resistances once located, the ground support aviation will be able to deal with them with redoubtable effectiveness by means of guided air-ground missiles, particularly if these objectives are dense. But if the defender makes intelligent use of the terrain and cover, if he disperses himself, conceals himself, or camouflages his emplacements (the least effective means of protection), he will "disappear into the landscape" and present no target that would justify attack from the air. The only elements that could be spotted easily would be the mobile groups charged with adding volume by fire: artillery, heavy infantry weapons, and tanks.

In war with classical means the assailant will probably still employ his artillery in large groupments. But lacking definite targets it will be obliged to employ area fire—a great consumer of ammunition and of limited effectiveness if the defender is well-dispersed. Conventional artillery hardly answers the requirements of this delicate phase.

Tanks can disregard the fire of the artillery and mortars of the defense, as well as its infantry fire, and plunge ahead to the discontinuous and thin line to penetrate it and roll it up. This threat is most serious. It must be considered carefully in the choice of the terrain, the obstacles to be held, the plan of demolitions, and in the antitank disposition.

Even if it is possible to contain the adversary at a respectable distance and avoid close combat during daylight hours, it cannot be expected that action will cease with nightfall. The night attack, conducted under the curtain of darkness, could produce a breakthrough, prevent all withdrawal, and cause the maneuver to collapse.

The efficacy and precision of the newer weapons are indisputable only when the targets are definitely localized and of sufficient density. In the delaying maneuver

the principle is to present neither of these conditions. It is one of the rare cases, we believe, where the assailant will have to depend only on his classical armaments.

To put them into action, and to break through the "crust" that is opposed to him, the attacker must resort to the concentration, either total or partial, of his available means.

His artillery may operate from dispersed position, and his infantry may infiltrate in small units, but matters are different as regards his tanks which, as we have seen, are the most serious threat for a delaying detachment. Engaged as small, dissociated elements they will be subject to the action of the increasingly perfected antitank weapons, for example, the French SS-10 (MILITARY REVIEW, Oct 1956, p 72). Only a massed attack can overcome this threat and "break through" the front, but this implies concentration. And all concentration on the part of the assailant opens the possibility of reactions by the new weapons.

Means for Delaying Action

Certain factors may disappear from the list of weapons previously considered essential in favor of weapons of greater and more certain effect. We cite heavy machine-guns and mortars whose weight and size are no longer counterbalanced by real efficiency. They must be used, in default of better weapons, but there are much better ones.

In order to treat our subject in a logical order, let us examine the enemy advance toward a delaying position.

The necessity for slowing it down postulates, first of all, a systematic employment of *obstructions* and *demolitions*. Passes and defiles must be considered, the possibility of their being bypassed evaluated, and they must be kept under observation and fire. The full value of a demolition is attained only when it combines mines in its approaches with the protective fire of mobile units, and with a smokescreen to

complicate the technical reconnaissance of the demolition. A technical advisor and a detachment of engineer troops are, therefore, needed in the delaying detachment.

Until recently, retarding action could begin only at the acceptable limit of accurate fire by the artillery. Now the field of battle extends over a great depth into the rear zone. It is possible to cause very considerable delays by preventing the arrival of supplies, especially ammunition and gasoline. An atom bomb of the normal type falling on a column of vehicles could destroy or incapacitate 150 of them over a distance of four miles. The material effect would, of course, bear little relationship to the formidable energy released by the atom bomb, but it would be accompanied by a prolonged immobilization and moral effects which are too often neglected in this type of calculations. With the eventual tactical employment of atom bombs and artillery shells, delaying action, thus far the responsibility of the rear guard detachments, could be expanded to include superior echelons and become a delaying battle.

Atomic artillery in its present form (280-mm cannon) is subject to many criticisms—too heavy, too cumbersome, too slow in its transportation and in its fire, too vulnerable. But at the limit of its 20-mile range, its percussion fire, although inadequate against human objectives, could possess a certain effectiveness in the destruction or neutralization of highway junctions. There is, it should be noted, one restriction which profoundly influences the modernization of the forces of Western Europe: this matériel, and the lighter pieces that have been announced, do not belong to it as proper possessions, and nothing seems to indicate that it will have them at its disposal on a loan basis.

Let us continue to follow the advance of the adversary toward the position. The moment now arrives to bring into action rockets of the *Honest John* type, of a

range of 15 miles. Transported on trailers, they can be brought up close to the delaying elements and be placed in the support of a superior echelon of the command (preferably the division).

Finally, in the zone of close combat we find the gamut of remote control antitank weapons of the *SS-10* and *ENTAC* type still in the evolutionary phase, for we are still in a state of transition. At the present time, the devices called new that may be employed in the framework of the delaying maneuver introduce into it nothing of a revolutionary nature. They do nothing but amplify fire possibilities in pursuance of an evolutionary trend that has been discernible for a century; they modify its capabilities in point of range, precision, rate of fire, and effectiveness. What then are the *means* a delaying detachment should possess organically?

1. Engineer forces for demolitions.

2. Mobile forces adapted to this type of combat.—Reconnaissance detachments thrown out ahead as far as the first line demolitions to determine the strength and the direction of march of the enemy columns. They will offer a nominal resistance for delaying the technical reconnaissance of the demolitions and the beginning of repairs. They will fall back by bounds and will provide the artillery with the information required for the opening of fire.

3. Artillery.—Usually there will be little of this on a permanent basis in a delaying detachment. The artillery is a rare and precious arm under the present conditions. A few well-commanded batteries, capable of a rapid change of target and of firing position, will be able to throw the enemy off the scent. The *temporary* assignment of reinforcing artillery, at times of superior caliber, to one of the withdrawal positions may increase the perplexity of the assailant.

4. Heavy machineguns.—The employment of these weapons is still conceivable for reinforcing the artillery fire at certain

points, and for action against secondary demolitions or obstructions, villages, and crossroads. This real effect cannot be great, but their moral effects remain. Artillery and heavy machineguns are two mobile weapons that are useful only in long-range combat. As soon as the first results have been obtained they may be moved to a rear line to ensure early occupation of this position.

5. Mortars.—These are suitable for short and sudden volleys against accurately determined points. A very considerable supply of ammunition is required.

6. Personnel carriers.—These will be, above all, mobile fire reserves permitting rapid concentrations on parts of the front where the enemy may attempt a penetration.

7. Antitank weapons.—Depending on the characteristics of the terrain, the organic allotment of the units probably ought to be increased, but in a very varying measure.

The efficacy and effects of these various weapons will be multiplied by their mobility. Under each of these headings we perceive the necessity for security on the march and in the position, and for flexibility. These two imperatives also are those of war of the atomic type.

The delaying maneuver requires, therefore, a groupment of all the arms comprising: infantry with its organic weapons, a reinforcement of antitank weapons, heavy machineguns, supporting artillery, some reconnaissance forces, some engineer forces, a special smoke-producing unit if such exists, and cross-country transport means.

The structure of such a detachment cannot be determined on a fixed basis, as it could not conform to all the various tactical hypotheses. It must be a temporary formation placed under the orders of an already constituted staff.

In our plan of organization we advocated the organic dissociation of the infantry

battalions and of the brigade (or regiment) staffs, these latter being exclusively operational headquarters capable of performing missions of varying character with different means in accordance with the objectives and the terrain. The delaying detachment would, therefore, be either of the reinforced infantry battalion type or of the brigade group or team type.

The battle must constitute an ensemble. It begins at the first line of demolitions, at the first screen of warning and delaying elements. It continues over a varying depth of territory and attempts to reduce the tempo of the enemy advance. This battle is *one* battle, for at no moment will the troops who have ventured forward of the army position be out of contact with the enemy.

At no moment may the commander (or the commanders) lose contact with the superior command. The improvements in means of communication have modified, and will continue to modify the factors of this problem radically. Let us speak only of the possibilities of television as applied to the operations. If this functions regularly (and this is likely to be the case since it is purely a technical problem) the army will be able to follow, hour by hour, the development of the delaying maneuver, not simply for the purpose of information as has too often been the case in the past, but with the desire of providing active collaboration.

The superior command has other sources of information than its units, and information will be communicated to them when it has a direct influence on their disposition. At times it will lead the command to take the additional actions indicated by the over-all picture of the operation.

The Employment of Aviation

The employment of aviation hardly is justified in the framework of the delaying detachment with the exception, of course, of helicopters, whose use may be

indicated for extending the field of observation or for rapidly transporting a local reinforcement to a critical point.

This arm is most effective with concentration and massive action. It must, therefore, be handled by the superior command.

If the enemy columns are really slowed down, halted, or bottled up by obstacles, they will constitute objectives for surprise aerial attacks. Radius of intervention of close-in air support not being very extended, these brief actions can be repeated continually. All such attacks will be localized, concentrated, tactical aerial offensives coordinated with the action of the delaying echelons.

The strategic aerial offensive, conducted to a greater depth against the transport, supplies, and other vital points, is independent of this maneuver, yet at the same time contributing to the same end. Everything that can hinder the enemy's movements, slow down its tempo, disorganize the enemy command, and deprive it of its freedom of action belongs in the framework of the *single battle*.

Reinforcements

During the course of the successive contacts which will be imposed by a well-conducted delaying maneuver, the only way to continue to deceive the enemy will be to modify considerably the intensity and the nature of the fires to which he is being subjected. From the enemy's standpoint, a temporary augmentation of the density of the artillery in a sector, and a change in the calibers employed, may be new factors of indecision. The mobility of modern artillery lends itself to this maneuver in depth and makes of it a force that is always recoverable if one takes the precaution not to engage it in groups of too great density.

It is certain that the atomic weapons—cannons, rockets, and other new weapons—can be integrated with powerful effectiveness in this program. But their inter-

vention, always dependent on the superior command, probably will be intermittent.

Among the possible actions to be taken by an assailant who refuses to allow himself to be frustrated too long by delaying action in depth are the employment of parachute forces and fifth column activity. There is no need to stress the risks run by delaying detachments who have difficulties in their rear areas. If the threat were localized, it would be possible to make use of the reconnaissance detachments from the front zone when their mission was terminated, permitting them to patrol the suspected zones. But one cannot ask everything of these units whose mission is a complex one.

Here, again, it is the superior command that must send the means necessary for "cleaning up" the troublesome areas, for occupying the vital points of the rear areas, for protecting the heavy detachments of atomic artillery, and, in general, for ensuring the security of the logistical movements. The entire responsibility for this must be assumed by the competent authorities of the main body of the army and not by the tactical commanders at the front.

Tomorrow's View

By extending our reasoning to its limits it can be affirmed that the ideal delaying maneuver will put into operation a maximum of fires of total effectiveness with a minimum of forces engaged.

The unit of measurement of destructive potential throughout the ages has been a simple formula associating the number of projectiles per minute (javelins, arrows, bullets, shells) hurled by a single man, and their power of destruction. The day the man has at his disposal an individual atomic weapon, his effectiveness would cease to be commensurate with his effectiveness in the past.

The transition phase will see a weapon of this type served by the smallest possi-

ble crew. It will thus combine *dispersion*, categorical imperative to security, with *mobility and power*.

One can, therefore, imagine units that are considerably lightened in their structure and their numerical strength—armored, motorized, and centered around atomic cannon or even more mobile weapons of mass destruction. Is there not already talk of an atomic mortar firing at a minimum range of five kilometers?

There will be little or no separation between the arms. The notion of the joint arms groupment itself will be strongly modified in favor of complete unity, a homogeneity never before attained in organization.

A revolutionary unit conceived in this way would combine mobility and power and constitute a constantly available reserve, a reserve which, moreover, would be the very first to be thrown into the front-line where there is a mission of delaying action.

The effects of the atomic action over a given depth of territory will be more enduring than that of the fires which we have reviewed. The use of a radioactive region by the enemy's large units might be rendered impossible for several days. During this time the atomic barrage detachment could move to another position from which other terrain might be rendered impassable.

It would be necessary, of course, to ensure the antiaircraft protection of this groupment, if its structure does not permit sufficient dispersion, and the delivery of supplies must be left to the logistical services of the rear.

All this is neither imagination nor anticipation. If these ideas are developed, a notable augmentation in the intrinsic value of defense probably would result by the evolution—capital in our opinion—of this defense in the direction of a "style" of high strategic and tactical mobility. The time to prepare for this is now.

Death of a Dinosaur

Digested by the MILITARY REVIEW from a copyrighted article by Major G. P. Crean in "The Army Quarterly" (Great Britain) October 1956.

THE entire history of warfare is a history of the contest between arms and armor which has continued in one form or another up to the present day. With the advent of the thermonuclear weapon, which can pierce without destroying and kill without wounding, a new era has started. But the basic principles of protection remain, and if this history is analyzed carefully an answer even to this new weapon can be found.

The Assyrians were, perhaps, the first to employ their lightly armored chariots "en masse" as an integral part of their battle formation, but there followed a long period of gradual decline in the use of these armored fighting vehicles, culminating in the established superiority of the Greek phalanx. This, in turn, was superseded by the open formation of the Roman legion, whose "maniples" made possible a more elastic defense and a more rapid attack, and which in its final form also included a small body of organic cavalry—an interesting development reflected in the introduction of organic armor into our latest infantry division. Later still, heavy cavalry trained to press home a charge, such as formed a large part of the army of Belisarius, destroyed once and for all the tradition of invincibility of the legion.

The use of heavy armored cavalry persisted throughout the Middle Ages until rendered obsolescent in its turn by the crossbow even before the advent of gunpowder. When the latter was established firmly as a weapon of war, all forms of armor were abandoned progressively and mobility and increased firepower were substituted as the more effective means of protection. The first full cycle had been completed.

The idea of the tank had, however, taken root when toward the end of the 15th century Leonardo da Vinci designed the first tank, an armored vehicle resembling an inverted saucer drawn, or rather propelled, by horses underneath, with cannon firing through ports in its sides. There is no record of its ever having seen action, and the lighter armed infantry of the day would have made short work of it if it had.

Over a period of some 400 years several unsuccessful attempts were made to create a satisfactory armored land vehicle. The first armored warship had appeared in the Crimean War, but the tank had to wait another 60 years. From 1916 until 1939 great progress was made in tank design, but World War II opened up a new phase. The struggle between "armored vehicles" on sea was transferred to land. The Germans were, perhaps, the first to apply the well-known naval principle that the gun would always be superior to the armor, and, consequently, throughout the war they mounted heavier guns than we did in tanks of comparable size and function.

Tactical Concept

The tactical concept of armored warfare—in the first half of the struggle at least—also had undergone a revolutionary change. No longer were tanks used solely as infantry support weapons—their original function—but in large armored formations with motorized infantry in what might be considered a secondary role. The success of the German armored-tipped offensive in 1940 was not due to Maginot mindedness on the part of the French, but to German armor breaking all the rules of orthodox strategy by rapid and deep penetration without consolidation, followed by almost independent although coordinated

destructive action deep in the zone of communications.

Defense in depth had long been the doctrine in the Allied armies, but although practiced tactically it was and still is, strategically, an impossibility. The destructive power of well-led armor even within a limited period of activity was such that it was the defense that had to yield first before the armor could be sealed off and exterminated. Once the gap had widened sufficiently to allow the main infantry to follow through, and then, if necessary, consolidate the flanks, it was virtually the end, for even with knowledge of the enemy's future intentions it was still impossible to organize on a purely defensive basis without losing the battle forward, which would have been almost as bad.

Later, in the desert, the idea of defensive boxes was conceived to meet this threat and, while successful just so long as an armored reserve was available to engage and defeat penetrations by enemy armor, led to immediate and total disaster once the enemy had overcome that resistance. The boxes themselves played only a passive role in the defensive plan and their fate rested entirely on the outcome of a battle fought by a fraction of the total force, the very worst situation in which any army could find itself. While it would be a great mistake to consider that armor alone could have such success in every situation, generally speaking, and as a broad and sound principle, armor is required to fight armor and an offensive defense is better than a static one.

Later still—and it is a question of “nothing deceives like success”—the superiority of airpower and artillery led to the tank being relegated to its 1916-17 role—that of an armored support weapon for infantry—with the same conceptions of limited movement imposed on the tactical and strategic pictures. The dangerously facile doctrine of “no infantry without tanks and no tanks without infantry” had

come to be, and is still considered, a rigid dogma instead of a tactical option.

Heavier Tanks

Bigger tanks with bigger guns became the order of the day, and instead of the quasi-naval engagements of the desert and the plains of Russia, armored warfare settled down to a bruiser battle. With the departure of the *Panther* went the last tank that could be said to fill the dual role of cruiser and heavy tank, and the *Tiger* marked a development in a different direction. Limitations of supply as well as the necessity for a heavy antitank infantry support tank played a large part in the further development of this tank into the *Royal Tiger*, when, however, German strategy was devoted only to staving off defeat until the V weapons, it was hoped, would turn the scales.

Whether tactical requirements on one hand or shortage of tanks, fuel, and personnel on the other may be considered to have imposed this change is really beyond the point. This concept of huge tanks with even bigger guns persists, and the major armies of the world are busy competing in producing larger and larger versions. It is fast becoming ridiculous that these monsters are now so big that only certain roads and bridges can carry them, and their guns so large that, besides necessitating special additional heavy loading mechanisms, they are becoming more and more of a one-shot weapon.

Their maintenance and fuel problems are formidable, and their relatively slow speed renders them quite unfit for any other use than as infantry support weapons; and they are so vulnerable at close quarters as to call even this into question. They require infantry protection at all times except possibly when laboriously slugging it out with an equivalent-size monster on the other side, and their vulnerability to close-range hollow charge projectiles, quite apart from their opponents' huge shell, is such as to call to mind the fable of the

elephant and the mosquito and a similar moral could be drawn.

In static dug in defense against tanks they might still be of value, but this is essentially a misuse of what is designed primarily to be a *mobile* fighting vehicle; in reality, considering their grave limitations and their tremendous cost it is difficult to justify their existence. The dinosaur, far from remaining the king of the animal world, went the way of the other prehistoric monsters as the result of attacks by his smaller and more agile enemies and a shortage of food. The big tank will almost certainly follow him.

Destructive criticism, however, is always easy but seldom justified unless a solution is proposed. The big tank played a most important part in the last war. Is the probable nature of the next any justification for its abolition? We know that these tanks have stood up well to atomic blast of moderate intensity, which means an intensity of destructive force unknown in the last war. But the human factor is the invariable one.

German *Tiger* tank crews in the Villers Bocage sector were, on occasion, knocked unconscious *inside* their tanks simply by the concussion of blanket bombing. Even the largest tanks do not provide any more really adequate protection against radiation than a more moderately size one, and under special conditions may actually provide less.

It could be argued that the extra protection of the large tank must be a point to the good, but is the large tank essential in nuclear warfare or is the experience of the last war superimposing itself on our ideas of the next?

The Effect of Atomics

One school of thought—the more optimistic one—maintains that the thermonuclear weapons have changed the essential nature of war very little. A more destructive weapon is only being introduced tactically or strategically to produce a

decision instantaneously and with more certainty than did the more orthodox weapons of the past. The other school maintains that the nuclear weapon has changed the nature of warfare even more than did the introduction of gunpowder.

It should be remembered that the first *effective* siege cannon were produced more than 200 years after the discovery of gunpowder, and the first *effective* fieldpieces another 200 years later. In the interim, cannon and firearms of a sort had been used and by their very limited success had gradually immunized armies against the morale shattering impact of the new weapon.

The only effect comparable with that of the nuclear weapon in our era might be that produced on the Aztecs and Incas by the firearms of the Conquistadores, and these were so limited in number and so imperfect as to render them laughable by the standards of even 100 years later. Nevertheless, the firearms and cavalry of Spain—both new and terrifying weapons to the Indians—made short work of two civilizations in a matter of months. Ours could go the same way in a matter of hours.

We, however, have the unusual advantage of a considerable study of the new weapon before the time of its employment in an all-out war. It was employed twice on an already defeated enemy in the last war, but it is fair to state that the terror and destruction were such as to bring *any* combatant—even on the eve of victory—to his knees within 24 hours. Human endurance has its limits, and it must be faced that even with a high standard of training in this form of warfare the formation sustaining a direct atomic hit will cease forthwith to play any further useful part. The survivors, if any, will break up into a series of panic-stricken individuals pouring back into the rear areas (or out of them) and shaking, if not destroying, morale everywhere. It would be better to

adopt a more careful attitude to the argument that "this cuts both ways."

Probable Enemy

First, let us be quite frank about our most likely opponents. Any German soldier who served on the Russian front will tell you that the slaughter the Russians sustained—almost willingly, it seemed—to drive the Germans back was almost beyond the limits of human credence. Call it fanaticism or call it bravery, the fact remains that we must be prepared to face an opponent on whom the psychological effect of nuclear attack might be considerably less than on us, and one whose enormous resources of manpower will enable him to suffer far greater casualties without materially lessening the momentum of his offensive.

Another advantage which the Russian Army possesses—and one the lack of which cost us dear in the wars in Burma and Korea—is the ability to live off the land, a factor which makes their logistical problem a considerably simpler one than ours. Furthermore, we must underrate neither the fighting qualities nor the standard of training of the Russian soldier. He not only has the experience of the last war to guide him but also has expert *modern* advice from Russian and German scientific sources, technically speaking, very little if at all inferior to our own. One final point—perhaps the most crucial one—the offensive probably will be launched by our opponents, which will give them, at any rate in the early stages, the initiative which could be decisive.

It would appear that the next war will be short but destructive to an almost inconceivable degree. With this dark prospect in mind what then is the solution? Defense in dug in positions? Even if every man were to devote all his energy to digging for hours, if not days, protection against the tactical nuclear weapon would still be inadequate, and becoming even more so as the weapon increases in destruc-

tive power. A dug in position whether of battalion, brigade, or divisional strength both immobilizes the formation and, what is worse, pinpoints its position.

The divisional defended area, bastion, or whatever it may be termed, automatically becomes a possible target for the tactical nuclear weapon, and if dispersed widely enough to avoid this, ceases to be a bastion at all and becomes an easy prey to more orthodox penetrations. While a defensive line on the Maginot scale perhaps could offer great protection, its very immobility weighs against rapid initiation of a counteroffensive, and time and politico-geographical factors put it completely out of the picture. Very briefly, then, it is submitted that the force which first allows itself to be tied down to defended areas will be annihilated.

This leaves only one possible solution. The enemy offensive must be met with an immediate, faster-moving and, if possible, even more violent counteroffensive, launched at the same time although *not necessarily at the same place*. This carries with it two great advantages: the enemy ceases to be the sole possessor of the initiative, and his offensive becomes automatically off-balance and is weakened, if not halted completely.

The Light Tank

There is every indication that the next war will be an infantryman's nightmare with the armored breakthrough the accepted "normal," and fought tactically and strategically at a speed unknown since perhaps the Tartar invasions. Mobility will count above all—the mobility that the large tank does not possess. This necessary mobility and hitting power *can*, however, be combined in an armored vehicle which depends more on mobility for protection than on the thickness of its armor plate.

With the recent developments in the gas-injection engine and the lightweight diesel the possibility of engines capable of

working on both fuels, and an armored vehicle capable of a range of 500 miles or more on one fueling cannot be cursorily dismissed. Tiny by present standards, perhaps, with a crew of two (or three at most) but mounting a high-velocity gun of the 75- or 88-mm variety firing hollow-charge projectiles (or even a short-range rocket projector), with small caliber cannon or machinegun as secondary armament against infantry, soft-skinned vehicles, and installations, such a vehicle could prove a most formidable weapon.

The largest tank rumbling along almost blind, its infantry escort shot down, would soon fall a victim to a concerted attack by two or three of these fast tanks or to the sniper shot from opponents who offer no target. Their tactical employment would be based on the principle of hit and run—not very heroic, perhaps, but extremely effective against a conventional enemy who would have to sustain organized and incessant armored attacks in all areas from front to rear. Even a powerful tactical air arm would be of very limited use against these small fast-moving vehicles.

From the wider tactical aspect the problem demands that both in defense and attack extreme mobility and flexibility are considered not just ideals to be aimed at but basic essentials which, unfortunately, most, if not all, of our present formations do not possess. Infantry divisions with intrinsic armor or armored divisions with intrinsic infantry are both too large and too immobile to stand up to nuclear warfare fought at breakneck speed.

The Combat Group

Under these exacting conditions the smaller independent combat group consisting predominantly, if not entirely, of light armor with some highly mobile infantry elements and a very limited amount of artillery attached is the unit of choice. Equipped with the type of vehicle suggested it would have a speed and range of

action outside all conventional armored practice. Every single item of equipment including the tanks could, if necessary, be transported by air *without any change in the ground formation and without any limit to its further activities.*

Their primary aim would be to attack the enemy always in his weakest spots along his lines of communication and in his base areas, to bring him ultimately to a standstill, short of supplies and *on the defensive*, and only then, like wolf packs, to close in for the kill. The enemy must never be given the opportunity of forcing the issue by a pitched battle with all forces engaged where his superiority in mass might prevail, but must be kept beating the air, with every mile of his advance becoming another mile of communications to *defend.*

It could be argued with reason that this might entail giving up essential ground, since the heavier formations with sufficient armor, artillery, and air support could always force their way through such an elastic defense to their objectives; but this is to presume a little too much. The combat group is not designed only for easy killings but also to hammer the heaviest opposition while suffering the minimum of loss itself, even though these tactics might entail giving up an essential objective instead of fighting to the last to hold it.

Far too much attention has been paid to ground. Time and time again so-called strategic keys have been captured at tremendous cost to open the doors of only empty rooms. Any ground, any objective, is useless without the capacity to exploit it further, and it can and should be given up without any qualms if the enemy can be enticed even one step farther toward his ultimate destruction.

Looked at in a little more detail from the nuclear warfare aspect it is admitted at the outset that combat groups sustaining a direct atomic hit might be little better off than other types of unit, but

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their entire tactical employment centers around the principle of close contact with the enemy at all times or, in the interim period after penetration, to offer a rapidly moving target of such small dimensions as to render a nuclear attack extremely difficult, if not impossible. To maintain mobile contact with the enemy is almost to ensure protection against his nuclear weapons without necessarily precluding the use of one's own. When combat groups have identified or by complete or partial encirclement molded a suitable target—for example, a division compressed by an attack on the move—this might certainly justify a tactical nuclear missile and a localized base or defended area even more so.

There is one other weapon, although not nuclear, which must be discussed in relation to the next war. Gases, more particularly nerve gases, although known, were not employed in the last war, the state of preparedness of the combatants and a war of movement rendering their use of doubtful value. One could, therefore, claim that

the combat group by its very nature would be virtually immune, whereas a static or unprotected target might be well worth a surprise of this kind if only for the temporary but perhaps devastating effect on morale.

In Summary

The large tank has outlived its usefulness and should be replaced by a smaller and very mobile vehicle, lightly armored but with adequate hitting power.

The nuclear war will be fought at a pace hitherto never encountered, and units must, therefore, be so highly mobile and so deployed as to seldom, if ever, present a suitable target for even tactical nuclear attack.

The divisional unit is too big and too cumbersome for this form of warfare and the smaller armored combat group—all of whose requirements could, if necessary, be air transported—should take its place.

Not "Dig or Die" but "Move or Die." The army which relies upon fixed defensive positions will be annihilated piecemeal.

The Future of Antiaircraft Artillery

Digested by the MILITARY REVIEW from a copyrighted article by Major J. R. Salmon in the "Australian Army Journal" July 1956.

FROM the time the first atom bomb exploded we have heard a great deal about a "pushbutton" type of warfare in which the infantryman and conventional weapons would play little part. Now that surface-to-air guided missiles are in existence, the pundits have prophesied the end of the antiaircraft gun and that branch of artillery directly connected with air defense.

However, just as the infantryman is assuming a greater importance in the atomic era, the antiaircraft artilleryman will have a more important and increasingly difficult task to perform in the guided missile and atomic age.

False Impression

It appears that the disbandment of the antiaircraft command in the United Kingdom has caused many to assume that the day of the antiaircraft gun has gone. The breaking up of this static organization would be better interpreted as a need for increased mobility of antiaircraft defenses. With the height and speed of attack of aircraft and missiles changing almost daily, it is no longer economical to spend vast sums on static emplacements and equipment which cannot be moved to deal with changing enemy tactics. Thus it is preferable to keep one's weapons in mobile antiaircraft groups.

It is worth noting that neither the United States nor any other country has dispensed with antiaircraft guns, although the United States is now equipped with the *Nike* missile. In fact, General Alfred Gruenther, Supreme Commander Allied Forces in Europe in 1955, took the unusual step of making a press statement to the effect that he hoped that NATO countries would not interpret the demise of the antiaircraft command in Great Britain as the signal for the scrapping of their antiaircraft defenses. In fact, he strongly urged them to retain their guns as they have a definite role to play.

The Role

"Conduct of War" states:

The aims of air defense are to ensure that enemy aircraft:

(a) *Cause the minimum of disturbances to civil and military activities.*

(b) *Are hindered in carrying out reconnaissance.*

(c) *Suffer such casualties as will deter them from attacking strongly defended areas.*

The gaining of air supremacy is the best form of air defense.

The two principal elements of air defense at present are fighter aircraft and antiaircraft artillery. Shortly, guided missiles will be available to assist the fighters and guns.

With two services involved, the planning of air defense is a joint army-air force problem, while operational control of the various elements is vested in the air force.

In considering the role of antiaircraft defenses, let us direct our attention to the protection of the forces in the field—in particular those in the combat zone. It is, of course, very important that the field force commander should be protected from air attack. Without air supremacy he has no chance of taking the initiative or winning the land battle, and air supremacy starts with effective air defense.

Can the air forces alone achieve these aims?

Air Force Limitations

At the outset of a war the air forces will be very busy trying to establish air superiority. There will be few, if any, aircraft available to protect the combat zone, and air defense will be nonexistent unless there are guns and guided missiles suitably sited in the forward areas.

When, or if, air superiority is achieved, modern jets will be unable to intercept the enemy over the combat zone as the limited range of light radars in the field will not give warning until they near our frontlines. In support of this argument, I want to quote two authorities, but suggest the reader should make his own calculations based on the time required to get early warning to airfields, to get fighters airborne, and to direct them to the enemy after they have climbed.

The British Army and the Royal Australian Air Force Staff College précis on "Air Defense in the Field" issued to 1955 courses states:

A fighter interception is not easily arranged against raiders moving at 10 miles a minute even under the optimum conditions of a static air defense system. In the combat zone where operations on the ground may restrict the deployment of radars, and frequent moves hamper signal communications, the prospect of interceptions over corps and divisional areas is receding sharply; against low-flying raiders this is especially true. The trend in the future is that the army will have to defend itself within the combat zone.

General Gruenther, speaking to the press in Paris on 29 March 1956, while talking of the highly organized defense system in northwest Europe, remarked: "An attacking aircraft could be 80 miles inside the frontier before it was intercepted by a fighter plane."

The army in the field has most to fear

from reconnaissance aircraft, which may provide information of suitable targets for the enemy's atomic weapons, and the sneak raider who, approaching from outside the coverage of the air force early warning system, is able to deliver his weapon before fighter aircraft can reach the area. With the best will in the world, the air forces equipped with jet fighters of limited duration obviously will be unable to give continuous cover over the tactical battlefield, and their capacity to intercept sneak and reconnaissance aircraft is certainly questionable.

This is particularly true when the raider approaches at low level. Siting problems and radar characteristics are certain to prevent adequate early warning of aircraft below 5,000 feet. As the attacker's height increases he will be detected at greater ranges, and with the improved climbing capabilities of fighters more interceptions will be possible. However, it should be apparent at this stage that the combat zone cannot be adequately protected by fighter aircraft, and the army requires weapons with which to protect itself.

Missile Limitations

New guided weapons will have some serious disadvantages from the point of view of the army in the field. Besides the problems of cost and weight of the equipment, the ground-to-air missile is not going to provide an effective answer to the "hedgehopper." In fact, as long as these missiles rely on radar for early warning, and more especially control, their performance is limited by the radar characteristics.

Consider a 600 mile an hour aircraft at 500 feet approaching a hypothetical missile site equipped with a tracking radar of over-all beam width of eight degrees. This means accurate tracking is not possible at angles of less than four degrees—in fact, not before the target is about 2,350 yards away. This allows only eight seconds for firing the missile, assuming

adequate early warning has previously been obtained for alerting crews and pointing the launcher in the required direction.

Even if this could be done, the rates of change of bearing and angle of sight would be so great by the time the missile had been launched and achieved stability that it is quite improbable that the missile's control system would be able to deal with these violent changes.

Based on such a small effective range the number of missile sites required would be impossibly large and for the present we can discard the idea of the guided missile replacing the gun in the light antiaircraft role.

The above figures assume perfect radar siting, which will never exist. This factor, coupled with the improbability of a missile being able to cope with high rates of change of bearing and angle of sight in the immediate future, would suggest that missiles will not be able to deal with fast-moving targets flying at heights below, say, 10,000 feet.

At the same time, to quote Gatland:

One might be impressed by an American estimate that, using the Boeing GAPA rocket, the cost of defending a city the size of Washington would be 40 million dollars to destroy 250 bombers, or 100 million dollars to counter a 1,000-bomber raid. . . . While the amount of guidance equipment carried in the 20-foot Nike is comparatively small—being essentially a receiver and appropriate servomechanisms for working the controls—the ground equipment is exceedingly complex and contains no fewer than 1,500,000 individual parts.

When one considers the production problem, and that Australia's economic capacity to pay for some much needed and less expensive equipment is strictly limited, one must expect that the ground-to-air missiles available in the combat zone will be rather small after the needs of Australia's air defense and the communications zone are

met. Thus if we can effectively use guns to deal with a target we should do so for economic reasons.

Another problem, and one which will face the air defense commander, is how he is to maintain a supply of missiles on his launchers under heavy or mass raid conditions so that he always has a weapon ready to launch against a target—especially that target following in a wave of bombers. One suggestion is to use an improved mobile heavy antiaircraft gun of increased lethality to deal with all possible targets, reserving guided missiles for those escaping or outside the capacity of the guns.

When bombing from a height, using a bombsight or the latest electronic means, a bomber still requires a period during which a constant course must be main-

This plan envisages three weapons. If we could reduce it to two we might effect a considerable saving of effort. While a gun might be designed capable of engaging all targets up to 10,000 feet, it is probable that its effectiveness above this area would be limited to the lower heights by weight considerations.

One big advantage is that a universal gun with on-carriage-mounted control facilities might be able to deal with a target which is at present relatively immune from the rather conventional coverage plan just mentioned. That is, a target approaching low, climbing rapidly to 12,000 feet when the light antiaircraft defenses are reached, dive-bombing from that height to 6,000 feet, then escaping at low altitude.

Although it would appear economical to have one gun capable of engaging all

Ground to 5,000 feet -----	An improved form of light antiaircraft gun.
3,000 to 10,000 feet -----	A new mobile heavy antiaircraft gun.
10,000 to 35,000 feet -----	Shared between the heavy antiaircraft gun and missiles, with the latter increasingly responsible as height increases.
Above 35,000 feet -----	The exclusive field of missiles.

tained. As long as this remains in the 30-second or higher time bracket, the aircraft becomes an admirable target for an improved gun employing improved prediction and radar techniques.

The antiaircraft shell is not effective above 35,000 feet. As we approach 20,000 feet and below its efficiency increases, so above a height somewhere between these two, air defense becomes the exclusive province of the guided missile in conjunction with fighter aircraft, should interceptions be possible.

Height Coverage

From these arguments it would seem that for the present, air defense in the combat zone should be provided under the command of one service somewhat as shown above.

types of targets at all heights up to the minimum effective height of missiles, this would be offset by the increased requirement for missiles.

Low-Attack Threat

We have seen that our greatest threat at present is the low-flying aircraft. Before we consider what current information is available on how to deal with this problem, it is well to see what the pilot is likely to do and how we can interfere with him.

Assuming the aircraft will approach as low as map reading will permit, he still must find and identify his target. In an aircraft traveling at 400 to 600 miles an hour, this is a problem in itself, particularly if the target is well camouflaged and concealed, and the pilot may have to climb to several thousand feet to identify it. Then he must get his fast aircraft into

position for the attack, probably a shallow dive, during which accuracy prevents him from exceeding a speed of about 450 miles an hour. During this time our guns are engaging him and upsetting his aim. Having released his weapon, the pilot has to escape from the guns, climb to get back his sense of direction, and get home.

Thus the pilot's task is a difficult one which is carried out at great speed. If we can get our fire sufficiently accurate to disturb him and distract his attention, his aim will be upset. The truth of this was proved in Korea when time and again Chinese 37-mm gunners caused inaccurate bombing and strafing with conventional weapons. Furthermore, they destroyed a considerable number of aircraft.

The mere presence of guns will prevent attacks being made as the pilot pleases, and the capacity to hit back will do much to boost the morale of the soldier on the ground. Destruction of aircraft, preferably before they have released their weapons, must always be the anti-aircraft gunner's aim and with new weapons he *will* destroy more despite the improvement of aircraft performance.

The new *Bofors* 40-mm light anti-aircraft gun is eminently suitable for the light anti-aircraft task and the firm's brochures mention the following characteristics:

Weight	About four and one-half tons
Muzzle velocity	3,000 feet per second
Rate of fire	240 rounds per minute
Shell weight	Two pounds
Effective range	2,500 to 3,000 yards
Rate of traverse—	
Bearing	85 degrees per second
Elevation	45 degrees per second
Effective height	Up to 6,000 feet

The gun is very mobile and can be controlled manually, by local power control,

or by remote power control using automatic radar fire control equipment.

A remote power control system employing narrow beam radars will enable adequate early detection of low aircraft if given a reasonable site from the radar point of view.

This presents a lethal combination to low-flying aircraft. As these facts can be gleaned by writing to firms or reading magazines, it can safely be assumed that the equivalent or better equipment is available in the British service.

Conclusion

As development takes place in light anti-aircraft, so it obviously does in bigger weapons. The new heavy anti-aircraft weapon will have to be mobile and dispense with all manual operations to achieve the required accuracy. Full remote power control and automaticity in heavy guns is obviously essential and not far off for field equipment.

The missile appears usable in static air defense, but there are special anti-aircraft problems of the field force and in particular those of the combat zone. Here, air defense will require a combination of light anti-aircraft, heavy anti-aircraft guns, and guided missiles for some years to come, and the desirability of one service commanding both is apparent.

Just as the end of piloted fighter aircraft in the air forces is in sight, so is possibly the end of the gun. However, both will take some time to die. There is no doubt that both have a very useful role to play for the next 10 to 20 years.

At the same time, radar techniques and the principles of target selection, target surveillance, and acquisition as employed in heavy anti-aircraft today are with us to stay, as these will form the basis of guided missile employment. It is up to all anti-aircraft gunners to master these and, at the same time, we must prepare our thoughts for the problems that will come with new weapons which are surely not far off.

Science in War

Digested by the MILITARY REVIEW from a copyrighted article by Dr. R. Cockburn in the "Journal of the Royal United Service Institution" (Great Britain) February 1956.

ONE of the most notable developments during the last war was the incursion of the scientist into military affairs on an unprecedented scale. Well before the outbreak of the war it was foreseen that survival would depend on the development of new techniques, and the scientific potential of the country was harnessed to the war effort.

What had not been anticipated was the contribution which scientists were able to make outside their immediate field. By the end of the war they were engaged not only in developing and producing new techniques and in training the armed services in their use, but they were also engaged in the analysis of operations, the development of new tactics, and even the planning of campaigns.

The integration of the scientist and the soldier must not be regarded as a mere wartime expedient—it is even more essential in peacetime. At its core are the government research establishments. Conditions at these establishments have improved vastly compared with the years between World Wars I and II.

At the present time there is a continuous interchange of experience with industry, with the universities, and with government laboratories in other countries. The integration of defense science with industry and universities on the one hand, and with the armed services on the other, is very close. It is now unlikely that the military value of any new scientific technique will be overlooked or that an operational requirement will have to be abandoned for lack of expert technical knowledge.

The very efficiency of this machinery creates its own problems. We do not have the means to follow up every promising technical possibility or to ensure against every military risk. In defense we can af-

ford to tackle only those projects which are essential for our security and for maintaining our responsibilities overseas.

Providing new weapons is a lengthy and complex business. Projects must be planned, not on the basis of current requirements, but on those which may arise 10 years later. Future requirements can be defined only if the strategic background is clear. However, the effects of scientific progress are becoming so profound that they are a cardinal factor in establishing future strategy. The trend of scientific development and the evolution of strategy have become mutually dependent and cannot be considered separately.

New Strategy

The combination of the nuclear weapon with supersonic, and eventually ballistic, flight favors the offensive to such an extent that to many it must seem that civilization lies at the mercy of the first aggressor. There is no justification for such pessimism if we face the challenge boldly.

The concept of the knockout blow which the power of the nuclear weapon and the range and precision of delivery from the air has revived is not a new one. The possibility of overwhelming surprise has occurred before in history, but it has not been realized often. It too easily underestimates the resource which a nation will discover in the face of a gross military disparity.

Although a balance will always be achieved eventually between offense and defense, there can be long periods when one or the other is clearly superior. Thus World War I was essentially defensive because of the development of automatic firepower. By World War II the gasoline engine had restored armored mobility on the ground and made airpower practicable.

This swung the balance in favor of the offensive. As the war progressed, however, antitank methods developed, and radar restored the power of the defensive in the air. If the nuclear weapon had not arrived, the defense would have been in the ascendant once more.

The nuclear weapon has changed the situation completely. It has created a disparity in favor of the offense which can be expected to increase rather than decrease during the next decade or two. This disparity does not rest on a discrepancy of techniques. Postwar developments in propulsion, aerodynamics, and radar are improving the weapons available to both the offense and the defense. There are two overriding factors which place the defensive systems at an increasing disadvantage, however.

The first of these factors lies in the explosive power of the nuclear weapon. This is many orders of magnitude greater than the largest high-explosive bombs of the last war. It is so great that the offensive need no longer build up and maintain its attacks against a target system over a long period. One concerted raid can carry enough striking power to annihilate an entire target system. Thus the offense can decide the time and place of attack, and it has a wide choice of alternative targets. The defensive system, on the other hand, must be effective at all times and at every point. It must not merely work, it must work the first time and be so efficient that the chance of being surprised or overwhelmed is negligible.

The second factor adversely affecting the defense lies in the increasing speed of flight. Air defense is dependent on radar and is fully effective only within the radar horizon. Although the speeds of both offensive and defensive weapons increase proportionately, the time available for implementing the defensive system is becoming steadily smaller. Of course the offensive vehicle also has less time to effect its attack, but against immobile industrial

areas it has only to confirm the appearance of the target at the anticipated time and place. On the other hand, the defense must not fail to detect and destroy each and every penetration within the short time available. Between them these two factors provide a tremendous advantage to the offense—the ability to surprise and overwhelm the defense. This is the vital issue in any consideration of future strategy.

When the offensive outstrips the defensive, the classical solution is to face the aggressor with a counterthreat. This compels him to divert effort from the offensive, and faces him with the same difficulties of defense. If the discrepancy between offensive and defensive techniques is not too great, at least a measure of military stability may be established. But the stability is far from complete.

In the process of competing for technical or numerical superiority, one side may believe it has achieved a temporary advantage and embark on a preventive war before the advantage disappears. Furthermore, under conditions of tension, there will always be the temptation to get in one's blow first. Each side hopes to restrain the other by a demonstration of strength, and the consequent arms race still further aggravates an inherently unstable situation. In the new strategy which is developing a number of unpalatable aspects can be discovered, but the precarious stability of the arms race which has been endured up to now has little to commend it, either.

A quite different situation arises when the disparity between offense and defense is very large. If both sides become convinced of their inability to avoid immediate and overwhelming retaliation, there is no longer any advantage to be gained from seizing the initiative. Thus the main cause of instability is removed. Perhaps for the first time in history the nuclear weapon provides the basis for a truly stable military environment. The key to this stability lies in the superiority of the offense

over the defense; and, the greater the disparity the greater the stability. If the offensive is accepted to be unstoppable, the logic of retaliation becomes inescapable.

The Logic of Retaliation

We are approaching such a condition, and the gradual relaxation in political tension which has come about during the last few years may be due to the appreciation of the growing certainty of retaliation. Supersonic flight will increase the advantage of the offensive still further, and any remaining doubts should be removed when ballistic missiles of really long range become feasible. When potential opponents possess such weapons, the threat of strategic attack can no longer be used as a compulsive instrument of policy. When the major military powers are known to possess the means for immediate and unstoppable retaliation, the strategic threat becomes neutralized. This is so, however the threat is imposed, and the role of strategic air forces, for instance, will be similarly restricted.

It would be a mistake, however, to overestimate the extent of the resultant stability. Although retaliation removes one particularly damaging threat, it does not remove the possibility of war. The action of the deterrent is negative; its sole purpose is to neutralize itself. Moreover its defensive function is restricted to areas which are completely integrated, both politically and economically. It does not extend beyond what might be called the tacit bomblines, that is, a line surrounding objectives which are vital to survival.

This concept of the bomblines is so important that its implications should be considered rather carefully. Neutralization only occurs if threat and counter-threat are truly reciprocal. It is clear that an aggressor would not feel restrained from attacking a nation whose retaliatory weapons were limited to targets of secondary importance. It is not so obvious, although equally true, that in the face of

retaliation, attacks on secondary targets cannot be prevented by threatening the aggressor's heartland. There will always be areas of interest outside the bomblines which must be protected but whose importance would not justify exposing vital objectives to retaliation. These areas must be defended directly.

It does not follow, however, that only conventional weapons will be used in peripheral wars. For instance, any large-scale naval landing would provide an ideal target for tactical nuclear weapons. Similarly, this threat to the landing force could be forestalled by attacking the opposing air force on the ground. Here again the weapon might well be used.

It sometimes is asserted that the tactical use of nuclear weapons would inevitably precipitate an all-out war. This may be so when no clear distinction can be drawn between military targets and vital objectives, that is, if the war occurs close to the tacit bomblines. But farther out on the periphery, the decision to use nuclear weapons is likely to be decided only by the local military situation, although not necessarily only by the local military commander.

Even within the bomblines the deterrent does not provide defense against all possible threats. No nation will invoke retaliation while there is any possibility of escaping a dreadful decision. In the absence of any direct defense, a series of minor infringements might have to be tolerated until eventually the ability to impose the deterrent could become irrevocably weakened. The position of the bomblines can never be defined precisely, and may depend on political factors which cannot be foreseen. Some direct defense in support of the deterrent is still necessary.

The logic of retaliation is the key to future strategy, but it is not an answer to every military problem. It can induce an over-all stability in the military environment, but only if it is properly supported; and this stability does not extend to the periphery. Despite these reserva-

tions, the nuclear weapon should lead to a real easement of the burden of armament, primarily because of the restraints which this weapon must impose.

Total war will become less likely as the deterrent concept becomes established. The exhausting attritional wars which have wasted the resources of the world twice within our lifetime may become things of the past. The precautions against such wars, which must be maintained even in peacetime, are in themselves a severe burden; we shall find relief in a number of directions when their necessity can be discontinued.

The nuclear weapon must also lead to a reduction in the scale of war. Logistic factors alone will prevent the deployment of large forces on the periphery, but there are more compelling reasons. The hitting power of the nuclear warhead has removed the need to carry large quantities of high explosives, and large concentrations of material must be avoided. There should be neither the need nor the freedom to mount the *levée en masse* typical of World Wars I and II.

As the strategy of deterrence matures, therefore, one of the most important consequences is likely to be a quite fundamental change in the logistic basis of war. Military strength will become dependent more on the quality of weapons and techniques—and of men—than on the size of frontline forces. The most important tactical problem facing the services is to assess the level at which future wars are likely to stabilize; for the scale of war affects our choice of future weapons and techniques.

For the defense scientist the nuclear weapon has created its own problems. Lethality alone is not enough. Even a hydrogen bomb is of little use in the laboratory. It must be carried to its destination, aimed with precision, and its target must be located and assessed. The stability inherent in the new strategy will only be realized if we maintain technical parity over a

wide range of essential techniques. Moreover, the overriding importance of maintaining the deterrent must not tempt us to neglect other military requirements without which the whole value of the deterrent would be wasted. The demand for research and development will increase in the future.

The Momentum of Research

Once the strategy is clear there need be little disagreement on the important lines of development. It is much more difficult to decide on the proper timing of projects. Building up and preserving momentum in defense projects is one of our most serious preoccupations. Clearly, the services must not be left for long periods dependent on weapons which are becoming obsolete. On the other hand, if there are too many successive projects, the pace of development will be so slow that we merely produce a succession of obsolescent weapons.

The research scientist is persistently criticized by the services for his apparent reluctance to commit himself to dates. The belief of the scientist that all things eventually become clear is a deeply established tradition. The scientist engaged on fundamental research is working at the frontier of knowledge beyond which is the unknown. There is continuous activity at this frontier, but for the most part it is a slow process of meticulous observation and a gradual refinement of techniques. No one can tell just when the accumulation of data will fall into a pattern and reveal a stimulating new concept.

The applied scientist accepts a different discipline. It is his task to decide what is feasible with existing knowledge and he cannot escape committing himself to a timescale. He must decide what risks are acceptable in a new project. He must avoid overensuring by taking too small a technical step which may lead to a weapon that is out-of-date before it has served any military purpose. On the other hand, too big a jump may lead to unforeseen de-

lays. It requires long experience and very careful judgment to avoid this dilemma.

It is not widely appreciated just how long a period is involved in the consecutive steps of research, development, production, and training. Even during the last war it could take up to five years to produce a new weapon in quantity. In peacetime 10 years can elapse before a new concept is available to the services.

These timescales apply quite widely. It is the rule rather than the exception for developments to occur at almost the same time in different countries, even though they may be isolated by strict security measures. At the beginning of the last war it was discovered that both sides had evolved radar systems and brought them to much the same stage, each thinking it was first in the field. At the end of the war both Germany and Great Britain were introducing jet aircraft into operational service. In the field of atomic energy it is becoming increasingly clear that progress is proceeding at very much the same pace in different countries.

Ten years is a significant fraction of a lifetime and in a number of critical fields, a weapon which takes 10 years to realize may have an operational life of only five years. Obsolescence is due to the introduction of a more advanced concept by a potential enemy or an ally.

The apparent discrepancy between the timescales of evolution and obsolescence is the natural consequence of continuous development. Even while a weapon is being produced, new concepts are being evolved. No country can expect to remain in undisputed possession of a new technique for any length of time. The only safe assumption is that a potential enemy is as knowledgeable as oneself and that once he has decided on a venture he will find the effort to achieve it. Therefore, it is essential to maintain the continuity and impetus of

our own research and development. Once the lead has been lost, it takes a very long time to regain it.

The solution is to arrange for successive projects to overlap rather than to shorten development time. In each field there would be two current projects, each planned on the basis of delivery to the service in about 10 years but staggered in time by about five years. It will require careful planning and restraint if we are to apply this policy throughout the defense field, but once the momentum has been established a number of advantages should follow.

With new developments imminent, it should not be necessary to squeeze the last ounce into current projects. A lot of time can be wasted by overelaborate specification. It should be easier to abandon existing methods as soon as it is clear that they will become outmoded and to divert effort to new projects. It requires courage to discard familiar and proved weapons in favor of new and untried concepts; but the services must take the risks, and the scientist must justify them.

Peacetime today is not a period of quiescence. We are engaged in a campaign involving both the soldier and the scientist; it is a campaign in time, a struggle for superiority in which the territory is mapped by dates, and victory is the achievement of a technique ahead of the enemy. It is a campaign which we are well able to conduct and which we can face with confidence. I do not believe that Armageddon is unavoidable or even likely. Instead, the world may well be at the threshold of a long period of military stability. Scientists have a part to play in guaranteeing this stability, but we must accept the fact that security resides more in the momentum of research than in the weight of production.

Battle in Mud and Marsh

Translated and digested by the MILITARY REVIEW from an article by Alex Buchner in "Wehrkunde" (Germany) July 1956.

THE beginning of 1943 saw the troops of the German Caucasus front retreating all along the line. The Seventeenth Army, which included the XLIX Mountain Corps, was being forced directly westward. In general, the retrograde movement straddled the Kuban River and was accomplished successfully by the utilization of numerous successive lines of resistance.

The combat area under discussion includes the eastern coastal region of the Sea of Azov, an unparalleled wasteland covered with water and water grass. This broad marshy region with its many open water areas had been transformed into a sea of bottomless mud and marsh by the spring thaw. What ice still remained was softened and weak and no longer capable of supporting any weight.

Only a few low terrain elevations and scattered, artificial dikes rose above the inundated rice fields and pasture lands. The estuaries in the northwestern portion of this region, with their numerous branches, were lined with water grass the height of a man's head. A few isolated farms and villages with their miserable clay huts formed the only settlements. Through this marshy region—universally regarded as impassable at this season of the year—extended a few paths known only to the native inhabitants. A larger highway—at this season also converted to mud—connected the town of Swistelnikoff with Anastasijewskaja, the seat of the XLIX Mountain Corps Headquarters. On the southern edge of the marshy region the only paved highway of the Kuban region ran from the east to the Taman Peninsula.

The weather increased the difficulties of the terrain. It rained, except for short interruptions, almost incessantly during the days of the fighting. A solid mass of clouds hung down over the rain-drenched land.

The nights were long and pitch-dark; heavy veils and banks of fog arose out of the marshland.

Defense

The enemy forces who succeeded in attacking over this supposedly impassable terrain consisted of three Soviet brigades with a total strength of around 3,000 men. They had been specially selected and organized for their particular task and were led through the marshland by guides familiar with the region. In addition to numerous rapid fire weapons, the Soviets were equipped with heavy weapons and knocked-down cannon. Their long advance through this inundated and marshy region testified in an impressive way to the toughness of the Soviet infantry.

The German XLIX Mountain Corps which was withdrawing to the north of the Kuban had difficult situations to overcome. At the beginning of March the corps, with its 6th Division, had occupied the Paula Line along the Protoka River. The withdrawal from this position was very difficult. The entire terrain and even the few roads leading westward were completely turned to mud, immobilizing the motorized and horse-drawn columns of the corps. Thus as far back as Anastasijewskaja, over a stretch of about 30 miles, an almost unbroken column of more than 7,000 vehicles lay motionless, bogged down in the mud. To save this valuable transportation, the front had to be held until the weather and labor forces had improved the roads. In continual violent frontal attacks from the east, the enemy, supported by artillery, tanks, and ground-attack planes, attempted to break the front of the corps without success.

Finally, however, an unanticipated attack from the north and rear through the

weakly secured lagoon region of the coast of the Sea of Azov struck the corps flank on 25 February.

By the night of 26-27 February reconnaissance elements reported enemy forces in Korsheviski. (See map on page 101.)

By this envelopment the Soviets not only threatened the corps' ammunition dumps, but also blocked the only supply route. By bringing up additional forces they could deal crippling blows against the entire corps rear area, and even attack the hard-fighting front from the rear.

Immediate countermeasures against this threatening danger included the necessity for halting the penetration to be followed by counterattacks to restore the rear area security. To this end all rear area units (already organized into alarm battalions and companies) were alerted. Security lines were established along the Kurka River with the mission of preventing the enemy from penetrating farther.

The 13th Armored Division attacked northwest toward Tschernojerkowskaja to cut off the enemy salient and prevent further movement of reserve forces southward over the lagoons. Intensive reconnaissance was established in a generally western and northern direction.

Counterattack Plans

Even while these first countermovements were getting under way, commands were sent out by the corps to free all possible forces from the front and to assemble them around Anastasijewskaja. The decision was made to attack the enemy movement in its flank, to intercept its advance, and annihilate the enemy forces which had effected a penetration. To this end, Attack Group West was formed from all the detachments of forces slowly making their way through the mud and arriving at Anastasijewskaja. Their command was entrusted to the commander of the 1st Mountain Division, Colonel von Stettner.

Even before this newly formed combat team became operative, the corps engaged

the 4th German Bicycle Regiment which was available immediately. Its 4th Battalion was to seize Swistelnikoff and the route leading to it as a possible point of departure for the German counterattacks. The 2d Battalion of the 4th German Bicycle Regiment, supported by an artillery battalion, was to attack in the direction of Korsheviski in order to open the supply route again as quickly as possible.

The mission given Attack Group West on the early morning of 27 February was to prevent further enemy advances toward the south, southwest, and southeast; to counterattack and annihilate him.

Orientation concerning the enemy, the terrain, and the German forces did not give a very encouraging picture. Strong enemy forces were firmly established in and around Korsheviski, Krassnyj Oktjabr, Otrub, Swistelnikoff, and Schedoljub. Weak German security forces, as in Schedoljub, had been attacked and scattered. Enemy forces had succeeded in reaching the large route on the south. At the moment, these attack points were remaining passive. The main body of the enemy was approaching, now being at the dairy farm northwest of Swistelnikoff. Prisoners had declared that the enemy's mission was to block the road at Krassnyj Oktjabr and cut off the corps' supplies.

Since it was without cover and passable only with difficulty, the terrain was quite unfavorable for a counterattack. The employment of motorized, mechanized, or horse-drawn units was impossible. An advance could be considered only by infantry and heavy weapons carried by it. The emplacement of artillery would have to be confined to the only route leading to Swistelnikoff.

From the standpoint of command the mixed combat team, made up of elements of three infantry regiments, three artillery battalions, a cavalry squadron, two antitank battalions, a construction battalion, and signal detachment, presented a definitely difficult problem.

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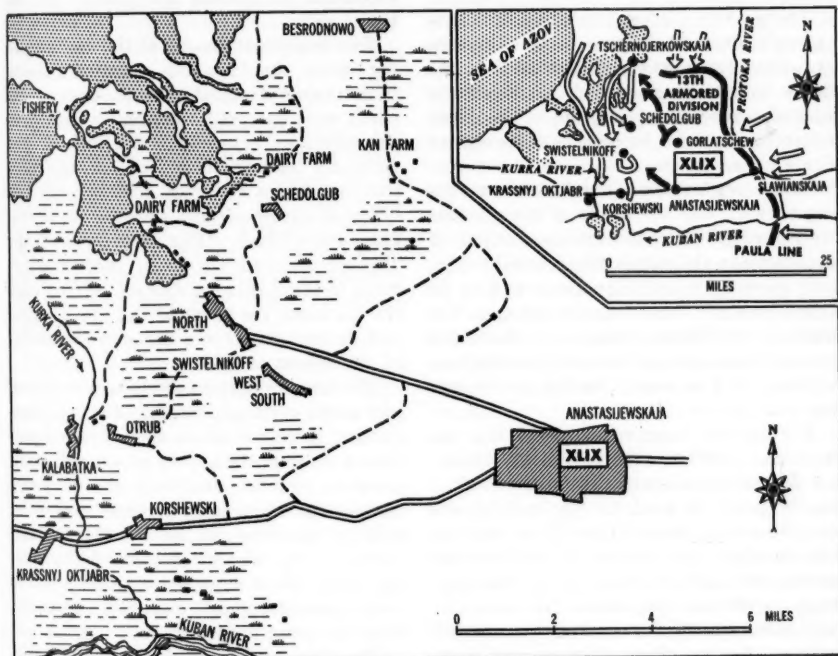
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With the route to Swistelnikoff as a base for assembly and the 1st Battalion of the 4th Regiment fighting there, the starting point for the counterattack was fixed. The combat team order of 27 February provided that the combat team would attack the east enemy group on 28 February at 0800 and gain and hold the line Schedolgub—dairy farm—as a primary objective.

Oktjabr and then turn northward for an attack on Otrub. The 2d Battalion of the 98th Mountain Infantry Regiment would be divisional reserve in Swistelnikoff.

The Counterattack

In spite of the total darkness and the continuing rain, the forces assembled and moved forward to the attack position over



The 42d Infantry Regiment on the right and the 1st Battalion of the 4th Bicycle Regiment on the left would make this attack.

The 42d Infantry Regiment was to take Schedolgub and drive the enemy back into the lagoons.

The 4th Bicycle Regiment was to seize Swistelnikoff and the dairy farm northwest of it. The 2d Battalion of the 4th Bicycle Regiment was to take Krasnyj

the only available route and were ready for action before dawn. Only the artillery had not been able to take up its positions due to the deep mud. The enemy at this time still was holding out stubbornly in the north half of Swistelnikoff.

The main effort of the 42d Regiment was made by the 2d Battalion, with the 1st Battalion and regimental staff following echeloned to the left. This provided depth in case of an enemy thrust from the

north, and permitted reinforcement of the untried 4th Bicycle Regiment, if necessary.

Delayed in a vain wait for the artillery to get into position, the attack on Schedolgub began around 1100 under indescribably adverse conditions. Long since soaked to the skin by the continuous rain, the companies worked their way forward through cold marshes, often sinking up to their knees or hips.

There was no cover anywhere from the enemy's fire, and digging in was impossible. The enemy was well concealed in the dense marsh grass—which provided the best of cover—or lay, dug in, in the dikes. Often he could not be seen until he opened fire at close range.

The heavy machineguns found few paying targets, and the shells of the mortars were ineffective in the marsh. Pockets of resistance in the marsh grass, small knolls, and more extensive elevations had to be taken in bitter hand-to-hand fighting. The leading battalion reached Schedolgub around noon and ran into the fanatical resistance of two enemy battalions defending that locality.

The division commander, perceiving the hard and slow advance of the 42d Infantry Regiment, directed the reserve battalion to push forward to the east of the marsh region toward Kan Farm and by this enveloping movement to threaten the enemy left flank and thus reduce the pressure on the 42d Regiment. The battalion was able to reach its objective by evening without having made any contact with the enemy.

In the meanwhile the two frontally attacking companies of the 2d Battalion of the 42d Regiment worked their way across the last two marshy stretches on the way to Schedolgub while an artillery preparation was in progress, and broke into the locality. Under this pressure the enemy began to soften and, with the approach of night, pulled back. The darkness rendered his pursuit impossible. Soaked to the skin, covered with mud, and exhausted

from fighting, the regiment, gradually arriving in its entirety, bivouacked in the rain.

The attack of the 4th Bicycle Regiment developed less successfully. The 1st Battalion was able to push the enemy out of north Swistelnikoff but was halted before the dairy farm by a stubbornly resisting adversary. The 2d Battalion, however, had succeeded in driving the enemy out of Korshewski.

Two important results of the day's fighting were that toward noontime enemy withdrawals from the south toward the north were observed, apparently caused by the attack on Schedolgub. Further, it was definitely learned from Russian prisoners that our forces had been dealing with two different enemy groups, thus far separated from one another. After assembling in the Tschernojerkowskaja area, they had arrived in the form of a western column over the ice along the coast of the Sea of Azov and an eastern column through the center of the lagoon region.

The enemy group in the Schedolgub area and north of it appeared to be more dangerous. It was decided, therefore, to prevent a joining of the two groups, if at all possible, and to reinforce the pressure against the dairy farm northwest of Swistelnikoff in order to isolate the western enemy group. The main body of the combat team would attempt to annihilate the east enemy group and close the gap to the 13th Armored Division.

The plan necessitated a further splitting up of the forces, but this had to be regarded as inevitable.

The 42d Infantry Regiment was directed to attack the enemy in Schedolgub at 1000 from the south, while the 2d Battalion of the 98th Regiment was to swing toward the dairy farm position to the north of Schedolgub in a pincer movement.

The 4th Bicycle Regiment would bar all enemy communications leading to the dairy farm northwest of Swistelnikoff, blocking it off. All antitank units were placed under

the orders of the regiment in order to pin the enemy down by fire. In this plan, one battalion of the 42d Infantry Regiment would attempt to make contact with the 2d Battalion of the 4th Bicycle Regiment approaching from the south.

The day of 1 March brought the first great success. The Soviets began to retreat in ever-increasing haste. In the hard pursuit fighting the fleeing Soviets, whose only way of escape lay across a branch of one of the lagoons, suffered bloody losses. The commander of the 42d Regiment reported in his notes with regard to this:

In long lines, one behind the other, the Russians waded up to their necks in water toward the northwest. The losses of the Soviets from artillery and machinegun fire were terrific. Only small groups of the enemy succeeded in crawling into the dense water grass around the lagoon where they hid and continued to fire on our forces from ambush.

The 42d Infantry Regiment and the 2d Battalion, 98th Mountain Infantry Regiment, had continued the attack to the north and succeeded in reaching Besrodnovo during the course of the day. Forces from the mountain infantry regiment continued in the direction of Tschernojerkowskaja to establish contact with the 13th Armored Division to the west.

No great change in the situation was reported from the 4th Bicycle Regiment. Enemy forces were still moving up from the south and assembling in increasing numbers around the dairy farm northwest of Swistelnikoff. The enemy here had made no move to go to the relief of his eastern group.

Early on 2 March a new and hitherto undetected enemy group suddenly appeared in the marsh and rice area north of the Schedolgub dairy farm. With a strength of about 500 to 600 men, they attacked the combat team's advance message center which had been established there. This force, in thrusting forward to Schedolgub,

could break up the main effort of the combat team, strike the weak 4th Bicycle Regiment in its flank and, perhaps, overrun the artillery. The commander's order to the German forces at the dairy farm was to halt the enemy at any cost.

One company was hurried there as rapidly as possible for reinforcement. At the same time, the order was issued to the 42d Infantry Regiment to turn immediately in the direction of Schedolgub. This attack also was entirely successful. In a complete surprise, the regiment caught the Soviets from the rear and completely obliterated them. In addition to a large amount of equipment, six cannon, one antitank gun, and two heavy mortars were captured. In the marsh around the dairy farm 450 dead were found.

On the evening of this day the first part of the mission assigned by the corps could be regarded as fulfilled. The danger of the enemy penetration into the corps' left flank had been eliminated, the enemy who had pushed forward was forced to retreat, and his east attack groups were annihilated.

The Final Assault

The next and last mission was the destruction of the enemy west group. Since the Russians were strongly organized here with a force of about 1,000 men thickly massed in a very narrow area, the annihilating blow was not to be delivered until the 4th of March, and the 3d was employed for preparation.

The 2d Battalion of the 42d Infantry Regiment was to attack from the Schedolgub area, take the dairy farm, and push on through to the fishery.

The 4th Bicycle Regiment was to seize and secure the group of houses south of the dairy farm. The first reinforced company of the bicycle regiment was to remain in Swistelnikoff to intercept the enemy still falling back ahead of the 2d Battalion and prevent his escape westward.

Information available indicated that the dairy farm was situated in a somewhat elevated area in the midst of the marshy region. It consisted of a number of buildings built of stone. Around it were machinegun nests, trenches, and antitank gun positions which commanded the few narrow approaches.

The attack of the battalion again had to be conducted frontally through the midst of the marsh. The prerequisites for success were first, the establishment of a strong protective fire, and second, the construction of emergency crossings by which the assault companies could cross the marsh rapidly. At the cost of a great deal of effort, the heavy machineguns and the heavy mortars were moved to a slight rise of ground southwest of Schedolgub during the night of 3-4 March and placed in open firing positions. The marsh was bridged with timbers and planks torn out of houses and huts. Deeper spots in the marsh were filled up with any type of material that could be dragged there. Places knee-deep or less were accepted as merely shallow and so marked.

During the night a shock detachment from each company moved across the marsh and dug itself in on the rising slope toward the dairy farm. The attack was to be led by these assault detachments in order to divert part of the enemy's fire from the companies which would follow them.

The participation of the *Stukas* in the attack was made possible by clearing weather. From 0730 to 0745 on 4 March, planes bombed the entrenched enemy with good effect. Concealed by the smoke of the bombs, the 2d Battalion of the 42d Infantry Regiment rushed forward to cross the marsh. Simultaneously with the departure of the last plane, artillery and heavy weapons fire began and continued up to the moment when the leading shock troops broke into the Soviet trenches at 0800. The enemy, completely demoralized by the fire, offered but momentary resistance at

a few points only and then began to flee toward the northwest. By 0815 the dairy farm was completely in German hands.

On 6 March a small Russian counter-attack force to the northwest was broken up by artillery fire. Enemy forces still attempting to resist were taken care of by the constantly advancing infantry, until fog, water, and the oncoming night necessitated a halt in the operations. Some portions of the enemy forces succeeded in escaping over the point of land north of the fishery.

For two days the 6th Company of the 42d Infantry Regiment followed the remnants of the Soviet forces through the lagoon areas. They pushed ahead through breast-deep water, resting and even bivouacking in the water. Not until 6 March did the company, from which no word had been received and which had been given up as lost, again appear south of Tschernozerkowskaja and join the 13th Armored Division.

The battle of the eastern shores of the Sea of Azov had been fought and won under unheard-of difficulties. In seven days of fighting the combat team had fulfilled its combat mission completely. The threatening danger in the rear of the XLIX Mountain Artillery Corps had been eliminated, the enemy forces which had effected a penetration had been destroyed, and a defense front established on the north.

German casualties were 221 men, 970 dead Russians were counted and, according to prisoners' reports, at least double this number must have drowned. Only 110 prisoners were taken. Of the three Russian brigades, only a fraction was able to escape. All the heavy equipment the Soviets had laboriously dragged through the marshes was left behind, including twelve 76.2-mm guns, two 45-mm antitank guns, 14 heavy mortars, and 52 machineguns.

Lessons Learned

This battle in the marsh is a masterful example of the fact that no terrain is so impassable that it can be assumed to be

a secure barrier to the enemy. Under certain conditions, even in a modern war, the fighting must be done by the infantry alone. Under bad weather and terrain conditions modern technique often has to give way to a seemingly obsolete style of fighting. The decisive element here is the individual fighter—hard, inured to hardship and deprivation, and capable of subsisting in close contact with nature. At the same time, energetic command is mandatory.

The main burden of the fighting was borne exclusively by the infantry which alone was mobile in this terrain. Inventiveness and capacity for improvisation aided in the crossing of particularly impassable stretches of marsh. The rifle was the dominant weapon of the individual fighter. Light machineguns often could be fired only from the hip. The assault rifle, which had not yet been introduced, would have been the most advantageous weapon.

Hand grenades proved to be of little effectiveness in the marshy terrain. Their effect often was dissipated by the tall marsh grass. It is to be established as a principle that the infantry should go into combat lightly equipped in order to retain all possible mobility in such terrain. A man with a heavy pack always will be a good target in a marshy area. Continuous food supply can be ensured only by carrier units in conjunction with the forward supply base system.

Delay in operations to permit the artil-

lery—as the sole supporting weapon—to get in position later paid off by its excellent cooperation. Its concentration in the only place suitable for positions—along the road leading into the marshland—constituted a marked risk; clearing weather and a breaking up of the cloud ceiling would likely have meant its destruction by the enemy's aviation. The artillery brought along by the Russians (intended for use after the marshy area had been crossed) showed up in the marshes only a single gun at a time, and then could not lend effective support due to the lack of suitable positions.

Heavy weapons carried into such a fight are of little advantage. They move very slowly and, because of their large ammunition requirements, necessitate additional carrier forces. They find few suitable fire positions, and constitute too conspicuous a target in the open terrain. The flanking fire of individual heavy machineguns along earth embankments in which the enemy may entrench himself for strong defense possibly could be effective.

Part of the effectiveness of the combat team was due to its good signal communications. Telephones, in general, were used to ensure the flawless transmission of orders. Where practicable, dispatch riders were used. On the other hand, the radio equipment often failed to function properly due to the extreme dampness of the area.

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Psychological Factors in the Atomic Era

Translated and digested by the MILITARY REVIEW from an article by Major Hans-Joachim Hupfarten in "Das Parlament" (Germany) 5 September 1956.

OUR era is more and more inclined to look for the answer to decisive problems in technique. This idea, however, often blithely disregards the fact that men must control technique, and that their place cannot be taken by robots.

Similarly, an extreme overconfidence in technique occurs in consideration of the principles of warfare and war itself. In addition, there are certain factors which also play an important role in war and cannot be neutralized by technical means. Foremost among them are psychological factors.

The dropping of the first atom bomb resulted in revolutionary changes in political and military thinking which often appears to have greatly decreased the significance of the former principles of war. It would seem more accurate to state that nothing more than a major shift has occurred in the order of rank of the principles of war. Nevertheless, as a result of incorrect understanding, the concept of "pushbutton warfare" has achieved a high place in military thinking. In a general sense it signifies that the individual man has lost his place as a combatant due to the technical perfection of weapons. This is a dangerous state of affairs, for the pushbutton warfare of soulless robots could seal the fate of humanity very quickly.

The significance of pushbutton warfare often is greatly exaggerated for political reasons, and easily gives rise to an incorrect picture of a possible war. In the foreseeable future, in most instances, the individual man still must have his same important functions in the frontlines. He will not only be subjected to the effects of all known and as yet unknown weapons, but also to the ever-increasing influence of psychological factors. It is certain that

these will owe their origin, in part, to the effects of the new weapons. In addition to these, however, forces and factors always appear in battle which cannot be measured in radius of action or other figures and which are often transmitted through the main body of forces as a chain reaction.

Many political and military leaders—for example, Napoleon, Ludendorff, and Churchill—have made use of psychological warfare. Psychological factors always have played a decisive role with generations of soldiers and will continue to do so in the future. In antiquity, the discipline and bravery of the Roman legions did not in all cases successfully combat the effects of Hannibal's elephants on their morale.

The famous battle standards around which troops rallied from the Roman times down to the time of the German wars of unification, disappeared from the battlefield with the beginning of World War I. Also, the close battle contact of soldier to soldier has yielded to the dispersion of the modern battlefield. Today, in the era of the atomic weapons, all areas and domains of the conduct of war have undergone a "loosening up" of all combat formations. As a result of this the individual soldier and commander faces the difficult task of overcoming, alone, negative effects of the psychological factors of battle.

The significance of psychological factors has by no means been reduced by the development of technique. On the contrary, it seems to be increased. A glance at the concept of panic justifies this idea.

Panic

The word "panic" has been tabooed in the armies of all nations. Hardly a commander has ever dared openly to admit panic as the reason for a defeat, for even

the mention of the word would have aroused doubts as to the ability and discipline of his unit. Today, when atomic weapons and other weapons of mass destruction have increased the amount of psychological influence enormously on both the individual and the unit as a whole, every military and political leader must become acquainted with this problem and seek remedies for it. No commander has yet found all the correct answers.

The skillful employment of psychological influence for military purposes begins in time of peace—so we are taught by recent history. For example, a long time before the outbreak of the war, Hitler made political use of psychological warfare against the nations outside of Germany, just as he used it later in the military field. The Allies very quickly followed his example after the outbreak of the war.

After 1945 the cold war between the West and the East arose as a way of avoiding a hot war. Today, great weight is attached to the fortification of the mind by psychological influences in all armies. The measures of the positive indoctrination are subject to fewer unforeseen influences in time of peace, and can be carried out without especial difficulty. A wide choice of ways and means is provided by technique. The other great complex, the negative psychological factors, present themselves only in actual combat. For this reason they are more difficult to define; there are no solutions to be found in regulations.

Influence of Command

Command can and must take preventive measures against the negative effects of psychological factors. In atomic combat, however, the direct influence of such preventive measures will be nullified largely by dispersion. The solution of this problem rests, therefore, with the lowest commands and the individual combatants alone.

One of the factors that occurs most frequently is surprise. This results in a tem-

porary crippling of the mind and defense ability. This terrorizing factor differs both in intensity and duration with each individual. There always occurs, however, a temporary state of helplessness as the result of surprise in combat. The enemy will seek to take advantage of this for gaining the upper hand.

Thus, for example, the first baptism with fire is one of the critical moments for a unit. It constitutes a psychological surprise for every individual, particularly since it seldom occurs as described in training. In the past the saber-wielding officer and stirring bugle calls were able to halt this paralysis quickly during the first baptism by fire. In the era of the atomic weapons, however, the surprise factor of the first nuclear fire baptism can bring about a catastrophe that will decide the outcome of the battle immediately or, even in the case of a less impressionable unit, badly shake its morale over an extended period of time.

But even disregarding the modern means of mass destruction, dispersion means that combat in covered terrain or in the dark will involve many factors of surprise which the future combatant must deal with alone. The crippling, terrorizing effect of a surprise increases with the mental tension in the man. Sudden reaction to this state often makes the soldier completely helpless during the first few moments. Furthermore, this shock may spread quickly through the entire unit if some of the men do not immediately recover their capacity for energetic action.

Some of the emergency measures and aids in the face of this shock are personal effort on the part of the leader to regain control of his men quickly, and immediate subjection of distress of mind and fear to the customary combat drill, as well as confidence in one's self and in whatever weapon or protective measure is immediately available.

In addition to surprise, other negative factors arise during combat. Some of them

appear from overdemands on the forces. Long, day-and-night fighting and deprivations gradually bring about psychic exhaustion. To these often are added uncertainty concerning conditions in the homeland and one's own situation, along with physical exhaustion through hunger, wounds, sickness, and the effects of weather. All these do not cause tensions in the man but do create an unavoidable increasing lethargy—a dulling of the mind—and, as a result, decrease alertness to danger and undermine the will toward instinctive reaction and self-preservation. Under these conditions every officer is presented the opportunity to show his qualities as a commander. In every sector of the fighting he must seek solutions and introduce measures that will bring the psychic load of his men and of his unit back to an endurable degree. If this does not happen, the negative factors will attain a degree of influence with which the individual fighter can no longer successfully cope.

Irrational Factors

While most of the factors thus far mentioned can be traced to their origin and for the greater part warded off, there are a few which stand in no casual relationship with the life of the individual soldier. For the most part these are irrational factors which are unforeseeable and not ordinarily susceptible to neutralization by human willpower. The sudden death of the immediate commander in battle is one of these irrational factors; another is an adversary who is known for his brutal warfare.

The European soldier with his traditional concepts of chivalrous warfare—even though these may be dust covered or exist only in his subconsciousness—is more sensitive in the face of merciless warfare than a more primitive people. In the last world war the mere knowledge of this type of warfare many times caused shock effects to appear that even led to individual surrenders.

A counterremedy is difficult to find in such cases since the point of origin of the influence is in the enemy himself. But often, a few courageous individuals who fight against such crippling factors with all their strength can draw the others with them.

A large number of negative factors have their origin in visible or measurable circumstances. They are based, in part, on the effects of new or unknown enemy weapons as well as on the idea that ones own weapons will no longer suffice repelling an attack. The panic resulting from tank attacks is an expression of these psychological factors to which all fighting armies have been subject. Since we are dealing here with logically comprehensible causes and effects, the primitive type of individual, as a rule, will be more strongly influenced than the intellectual type who can calculate, with some approximation, the amount of danger that exists.

Summary

The higher the degree to which armament technique results in leaving the individual soldier alone in his responsibility, the more significant the psychological factors in battle will be. Inner stability, combat morale, and combat worth are an indivisible whole. In battle these enable the soldier to withstand the enormous pressure of psychological factors and influences.

An army which ignores the significance of these factors and believes itself capable of solving the problems involved solely by modern armament technique, will very quickly find itself in the maelstrom of catastrophe. Therefore, everyone who is responsible for human beings, whether in politics or as a soldier, must recognize the importance of psychological factors and cooperate in the solution of the problems that arise. Only in that way will the nation, as well as the individual soldier, be able to survive in the era of the nuclear weapon.

BOOKS OF INTEREST TO THE MILITARY READER

THE ANATOMY OF TERROR. Introduction by Nathaniel Weyl. 73 Pages. Public Affairs Press, Washington, D. C. \$1.00.

By LT COL HOWARD L. FELCHLIN, *Inf*

The main part of this brief book is an interesting document which the State Department believes to be "a version of the speech" in which Soviet leader Nikita S. Khrushchev denounced Stalin at a meeting of the 20th Party Congress in Moscow, 25 February 1956. The prefatory remarks by Nathaniel Weyl represent a skillful analysis of the full significance of Khrushchev's speech which has shaken the foundations of the Soviet system both at home and abroad.

Since there appears to be little doubt as to the validity of this remarkable document, it represents a scathing indictment of the Stalin regime and a startling revelation of the inherent evils of communism. Khrushchev's vitriolic denunciation of Stalin's "cult of the individual" was more than a bid for the reestablishment of collective leadership; it was an act of self-defense in the savage struggle for power in the Kremlin and a desperate attempt to readjust Soviet policies to the realities of present-day conditions. But Khrushchev has not abandoned irrevocably the practices of Stalinism since he recently stated: "We are all Stalinists when it comes to fighting Imperialists."

A fuller appreciation of the impact of the anti-Stalin campaign can be obtained by studying Weyl's commentaries.

KHRUSHCHEV AND STALIN'S GHOST. By Bertram D. Wolfe. 322 Pages. Frederick A. Praeger, Inc., New York. \$3.95.

By LT COL MITCHEL GOLDENTHAL, *CE*

The enigma behind the alternate damning and praising of Stalin by Khrushchev and his puppets is confusing to say the least. In this precisely written book Mr. Wolfe crashes through this baffling barrier.

Mr. Wolfe, who has actually met Trotsky, Stalin, and Molotov in Russia, has been a distinguished specialist on Soviet affairs for many years. He provides an exhaustive analysis and commentary on Khrushchev's famous speech desanctifying Stalin. This secret speech to the 20th Congress on the night of 24-25 February 1956 is one of the most important documents in the history of communism.

The author completely and thoroughly analyzes the text, background, and meaning of this desanctification speech. All the usual doubletalk is equated to understandable English. The obscure references are evaluated and interpreted and all implications are closely examined.

Military readers will find this book extraordinarily rewarding in discerning the true motivation behind the recent contradictory statements by Soviet leaders.

PORTRAIT OF A STATESMAN. The Personal Life Story of Sir Anthony Eden. By Dennis Bardens. 326 Pages. The Philosophical Library, Inc., New York. \$6.00.

GARDE D'HAITI. Twenty Years of Organization and Training by the United States Marine Corps 1915-1934. Compiled by James H. McCrocklin. 262 Pages. United States Naval Institute, Annapolis, Md. \$4.50.

BY COL HEWITT D. ADAMS, *USMC*

This history of an almost forgotten era of United States intervention in the affairs of her neighbors in order to bring peace and order to revolt-torn nations would appear to have only academic interest to today's military man. There are timely lessons contained in the book, but the reader has to dig them out for himself. The facts are presented in an interesting manner; evaluation is notably lacking.

It is not difficult to draw a parallel between the unilateral occupation and rehabilitation of Haiti by the United States and the intervention by the United Nations in the Middle East today. The problems faced in many undeveloped nations are the same as those faced in Haiti. While it is inconceivable that the solutions would be sought by the same means, still a study of earlier action would appear to be timely.

Most of the book is devoted to an account of the work done by the *Garde* in rehabilitation and improvement. That service with the *Garde* offered excellent training for the acceptance of large responsibilities is shown by the large number of future Marine Corps general officers—and commanders—who served with that organization. The book offers in miniature the problems which face many military men today. Any officer who is ordered to a MAAG should read this account as a reminder that difficulties can be overcome by vigorous and imaginative leadership.

KILL OR GET KILLED. Manhandling Techniques for Police and the Military. By Lieutenant Colonel Rex Applegate, United States Army, Retired. 332 Pages. The Military Service Publishing Co., Harrisburg, Pa. \$3.00.

THE VIET-MINH REGIME. Revised Edition. By Bernard B. Fall. Institute of Pacific Relations, New York. 196 Pages. \$2.50.

WEYERS FLOTTENTASCHENBUCH 1956/57. Edited by Alexander Bredt. 332 Pages. J. F. Lehmanns Verlag, Munchen, Germany. \$6.67.

SOVIET AIR POWER. By Richard E. Stockwell. 238 Pages. Pageant Press, Inc., New York. \$7.50.

BY LT COL FOSTER F. FLEGEAL, *Armor*

This book is easy to read and fascinating in the almost fiction-like presentation of the history, development, organization, and status of the Soviet air arm.

The author traces the amazing progress of Soviet military airpower from its crude beginnings to its present position of eminence in the world, and in the process points out the tremendous strides that the USSR has made in production, both industrially and education-wise.

The chapter on the organization of the Red Air Force is exceptionally interesting to the military, and provides a clear picture of how the Red Army gets air support and the functions and organization of the six separate and distinct air forces which together make up the air arm.

A discussion on the state of the art, both in aircraft and powerplants, presents a good look at the Russian development of both, plus the probable future of their air arm. As an adjunct to this discussion, much emphasis is placed on the Russian insistence on simplicity of design and production which is responsible for high production.

The last chapter sums up Mr. Stockwell's warning by a comparison of the United States and Russia in the fields of education, scientific research, and airpower.

For those readers interested in detailed facts and figures on Russian aircraft, a well-prepared supplement goes into detail on all aspects of Russian airpower.

EMPIRE OF FEAR. By Vladimir and Evdokia Petrov. 351 Pages. Frederick A. Praeger, Inc., New York. \$5.00.

By LT COL IRVING HEYMONT, *Inf*

The Petrovs, husband and wife, gained worldwide notice in 1954 when they defected from the Soviet diplomatic service and were granted asylum in Australia. They revealed to the Australians the ramifications of a spy system which Petrov had tried to set up in Australia. While ostensibly diplomats, Petrov and his wife were actually officers in the *MVD* (Soviet Ministry of Internal Affairs).

In a very matter of fact style the Petrovs tell the story of their lives. Peasants by origin, as ambitious young people they availed themselves of the opportunities for advancement offered by the Soviet regime. They joined the *MVD* and were so successful that they were given assignments abroad, in Sweden and Australia—rewards given only to the most reliable. The price of success was the acceptance and participation in reprehensible acts ordered from above. The Petrovs contend that complicity in the immoralities of the Soviet regime is enforced by fear and that a major function of the security apparatus is manipulation of fear to keep the Soviet populace docile. In the end, the Petrovs were driven to defect not because of moral revulsion or loss of ideological conviction, but because of fear. They feared that they too at last had been placed in danger of slave labor camp sentences or even liquidation by their colleagues.

Empire of Fear is a revelation of life in the lower fringes of the ruling bureaucracy of the Soviet Union. It gives an excellent insight into the techniques of Soviet security operations. Above all, it is a fascinating study in blunted moral sense and perverted ambition enveloped in a smog of fear. For another clue into the psychology of the Soviet ruling system, this book is required reading.

THE ARAB-ISRAELI WAR 1948. By Edgar O'Ballance. 220 Pages. Frederick A. Praeger, Inc., New York. \$4.75.

By COL J. C. WINCHESTER, *British Army*

The future of Palestine and Arab-Israeli relations are of special interest at the present time. The political problems of this area recently have been discussed widely, but the story of the fighting that took place between the Jews and the Arabs during the past decade is less well known. A knowledge of this is essential to an intelligent understanding of the present political problems.

Here is an excellent, dispassionate, and factual account of the military operations that took place in Palestine in 1948 both before and after the ending of the British Mandate. The author, who was a professional soldier, has produced a short commentary which is authoritative, stimulating, and clearly illustrated with sketch maps. This book should be of particular interest to the military student who wishes to understand the capabilities and the strengths and weaknesses of the Israeli and Arab forces.

AEROPLANES AND AERO-ENGINES. 24 Cutaway Drawings Reprinted From *The Aeroplane*. Fourth Edition. The Philosophical Library, Inc., New York. \$6.00.

By LT COL ROBERT M. WALKER, *Arty*

This edition contains drawings by J. H. Clark, J. Crawley, B. A. J. Hutton, R. J. Way, and R. Wood which have appeared in *The Aeroplane* over the past two or three years.

Of particular interest to students of aircraft, engineering, the drawings feature a variety of types of British civil and military machines, including helicopters. These range from the largest airliners to the latest general-purpose and crop-dusting aircraft. Each drawing is supported by an extensive key, and there are 10 illustrations of aircraft powerplants.

SOLDIERS AND SCHOLARS. Military Education and National Policy. By John W. Masland and Laurence I. Radway. 530 Pages. Princeton University Press, Princeton, N. J. \$7.50.

BY COL HEWITT D. ADAMS, *USMC*

The authors, Professor and Associate Professor of Government at Dartmouth College, bring a wealth of scholarly, military, and governmental attainment to the task of "a study of military education, with emphasis upon the preparation of career officers for positions involving participation in the formulation of national policy." The result is a thorough analysis of the system of education (as distinguished from training) of the military officer. All levels of schooling are considered, although emphasis is placed on the service academies and the war colleges.

The authors present clearly the qualifications which they consider to be necessary for the filling of policy roles by military officers. These qualifications are supported by the reasoning back of their determination, and are open to no serious challenge. A great deal of the book is devoted to the history of the development of military education and to the analysis of the means of military education. The analysis of service schools is quite complete extending to such matters as curricula and the qualifications of instructional staff. The schools are then evaluated as to their suitability to develop the qualifications necessary for the filling of policy roles. An appendix gives some enlightening information on the extent to which officers are involved in the formulation of national policy.

Considered at some length is the selection of officers for attendance at the higher level service schools and the assignment of graduates of those schools. Joint education is stressed; the impact of personalities on the educational system is also covered.

Military education is given credit for some very substantial contributions. The weaknesses are pointed out in a spirit of constructive criticism. The authors show no bias either for or against the military. The book is written in a readable style, but it is not to be read lightly. It is recommended to all officers, and should be required reading for anyone who uses the expression "military mind."

A HISTORY OF SOVIET RUSSIA. By Georg von Rauch. 493 Pages. Frederick A. Praeger, Inc., New York. \$6.75.

BY MAJ HARRY H. JACKSON, *Inf*

Military readers will appreciate this well-organized survey of Russian history since 1917. German historian Von Rauch begins with an analysis of the forces that were in competition with the Bolsheviks in the struggle that culminated in the October Revolution (1917). From this examination he concludes that Bolshevik despotism was not inevitable in Russia. The ingredients for an alternative course to centralist dictatorship existed in the crumbling empire of the czars. The tragic failure of these political elements to survive the struggle for power with Red bolshevism is spelled out effectively by Professor von Rauch.

Of particular note is the appraisal of the German-Soviet political machinations during the World War II era. The German nonsuccess in exploiting Russian political and military defections is a classic lesson in unsuccessful political warfare. The Allied failure to open a Second Front in 1942-43, combined with Japanese efforts to mediate a separate peace between the Nazis and Soviets, points to the tenuous bonds that held the Grand Alliance. The delicate relationship between military objectives and political ends, as described by a German historian, deserves attention from those interested in political-military affairs.

THE WHITE HOUSE
WASHINGTON

February 19, 1957

ARMED FORCES DAY:

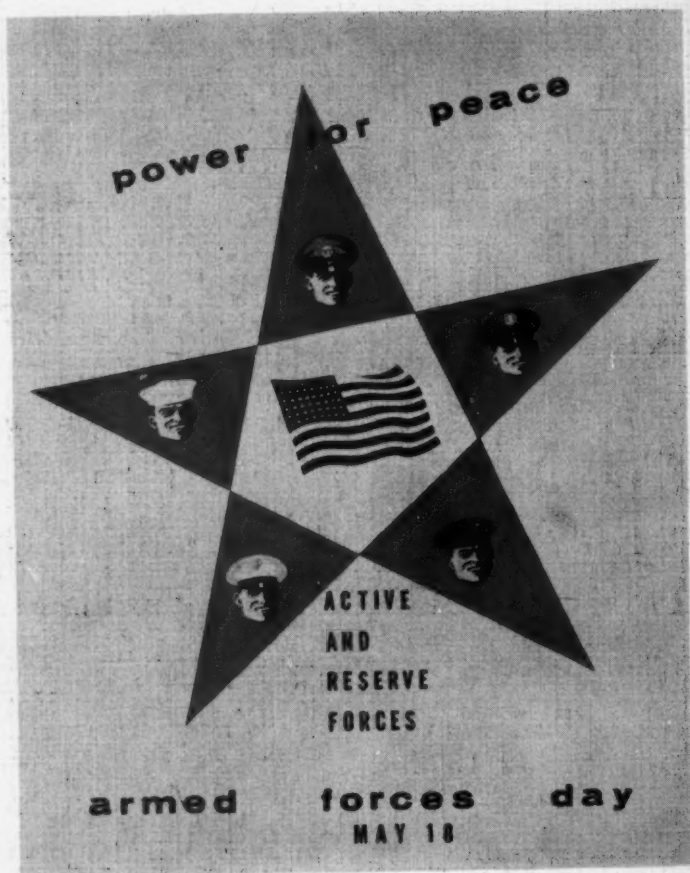
This is the day, set aside for the past eight years, to salute our fellow citizens serving in the Armed Forces of the United States.

We have provided our military personnel with the finest equipment and training in the world, but it is equally essential for them to know they have our respect and appreciation.

It is a privilege to join in honoring them and I urge all citizens, wherever the limits of time and distance permit, to take part in the observance of Armed Forces Day.

By arms, by work, and by spirit, it is the responsibility of each citizen to help in the defense of the national community.

Dwight D. Eisenhower



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